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1983
SUMMARY OF
RAILWAY ACCIDENTS/INCIDENTS
AS REPORTED TO THE
CANADIAN TRANSPORT COMMISSION

OPERATIONS BRANCH
RAILWAY TRANSPORT COMMITTEE
OTTAWA, CANADA
1984



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1983

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INTRODUCTION

A railway accident is an unexpected occurrence involving trains, engines, cars or on-track equipment, resulting in property damage or casualty or involving handling of dangerous goods, during actual train or yard operations. In this report major accidents are identified as train collisions, train derailments, crossing accidents and collisions/derailments that involve track motor cars and maintenance of way equipment. As a rule train collisions and derailments are more costly in terms of physical damage while crossing accidents cause more casualties. Minor accidents are train service accidents e.g. where employees or trespassers are struck by rolling stock or where personnel are injured in the process of entraining and detraining. Railways, under federal jurisdiction, are required to advise the Canadian Transport Commission on most such accidents. Certain types of incidents are also reportable. These include fires, dangerous commodity leakages, obstructions to main track and miscellaneous personal injuries sustained by railway passengers and employees.

The 1982 version of the Accident Summary departed from the format of earlier years in that an attempt was made to provide the reader with an explanation of the information being prescribed. The 1983 Summary follows the same format: the primary emphasis is on 1983 data and how it compares with compatible figures for 1982. Each section examines a particular accident category, the associated accidents/incidents and related casualties for the most recent two year period. Data for the years 1976-1980 have been taken for the most part from earlier versions of the Accident Summary and are being presented for reference purposes only, not being wholly comparable.

SECTION 1

SUMMARY OF TRAIN ACCIDENTS AND INCIDENTS

SECTION 1

SUMMARY OF TRAIN ACCIDENTS AND INCIDENTS

Accidents/Incidents

For the purposes of this report, railway accidents/incidents have been classified into three broad categories - major types of accidents, train service accidents and miscellaneous incidents. There was a marked improvement in the absolute number of major accidents in 1983 as compared to the previous year. These declined by 18.1%. Train service accidents, however, increased by 14.5% in 1983 while miscellaneous incidents dropped by 8.3%. Railway movement of freight tonnage was up by 3.8% over the year.

Accidents at crossings accounted for nearly six-tenths of the 966 major accidents in 1983. This was a 18.0% reduction from 1982. Train derailments accounted for a further 26% of major accidents and showed a 22.3% decline in 1983 from the previous year. The remaining 15% of major accidents are accounted for by train collisions and collisions/derailments involving on-track equipment such as track motor cars. These categories showed declines of 8.9% and 13.1% respectively.

Current data for major accidents also shows that some 60% of the total number of reportable train collisions involved cars carrying dangerous commodities; however, almost 80% of these D.C. related collisions occurred in yards during switching operations. Over one-third of all train derailments were D.C. related and of these cases just over half occurred in yards or sidings.

There were 703 train service accidents in 1983. Although these include employees and trespassers being struck by rolling stock, the majority of these accidents involved employees injured while getting off/on rolling stock.

Miscellaneous incidents numbered 2,925 in 1983 and these cover a wide variety of occurrences ranging from fires and D.C. leakages (not related to train accidents), to personal injuries incurred by railway employees and passengers. These personal injuries accounted for just over three-fourths of all miscellaneous incidents.

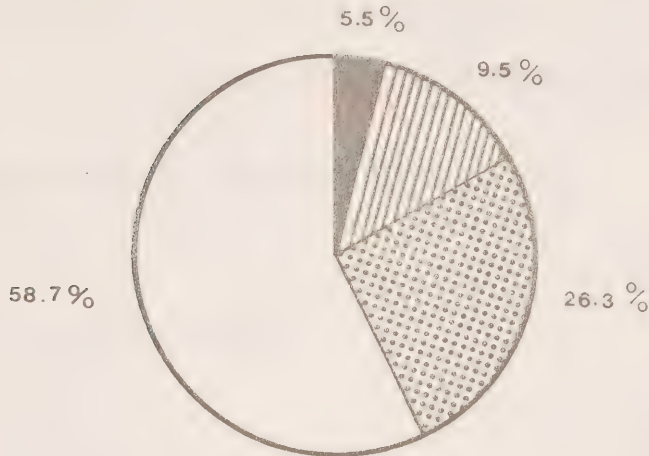
Casualties

There were 125 railway related fatalities in 1983, which is 14.4% lower than the figure for 1982. A little less than half of these fatalities occurred at railway crossings. Although crossing accidents are the single most important cause of railway fatalities, the persons killed are not as a rule railway employees or passengers. Almost all fatalities at railway crossings are motor vehicle occupants. Train service accidents accounted for another four-tenths of railway fatalities, the casualties being mainly trespassers and suicides.

Total injuries declined by 11.5% in 1983. Miscellaneous incidents accounted for two-thirds of the 3,511 injuries to passengers, employees and others in 1983. Train service accidents and accidents at railway crossings respectively accounted for a further 19% and 8% of total injuries.

Three-fourths of all injuries in 1983 were to employees; passengers accounted for another 15.2%. The remaining injuries were mostly incurred by the occupants of motor vehicles.

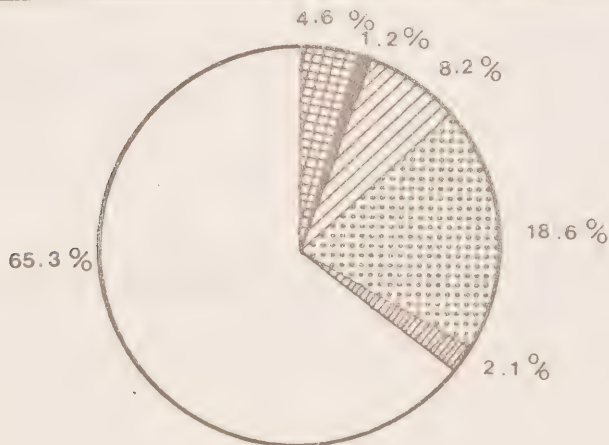
MAJOR TYPES OF ACCIDENTS 1983



TOTAL NUMBER OF ACCIDENTS : 966



INJURIES BY TYPE OF ACCIDENTS/INCIDENTS 1983



TOTAL NUMBER OF INJURIES : 3,511



SECTION 1

SUMMARY OF TRAIN ACCIDENTS & INCIDENTS

1.1 NUMBER OF ACCIDENTS AND INCIDENTS (1982 & 1983)

	<u>Accidents/Incidents</u>		
	<u>1982</u>	<u>1983</u>	<u>% Change</u>
<u>Major Types of Accidents</u>			
Collisions	101	92	- 8.9
Derailments	327	254	- 22.3
Crossing Accidents	691	567	- 18.0
TMC/MWE Collisions/Derailments	61	53	- 13.1
TOTAL	1,180	966	- 18.1
<u>Train Service Accidents</u>			
Employees Struck by Rolling Stock	29*	35	20.7
Trespassers Struck by Rolling Stock	91	111	22.0
Employees Getting Off/On Rolling Stock	494	557	12.8
TOTAL	614	703	14.5
<u>Miscellaneous Incidents</u>			
Fires	273	254	- 7.0
Dangerous Commodities Incidents	105	288	174.3
All Other Incidents	2,811	2,383	- 15.2
TOTAL	3,189	2,925	- 8.3

*Includes 1 passenger being struck by rolling stock.

1.2 NUMBER OF ACCIDENTS AND INCIDENTS (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Major Types of Accidents</u>								
Collisions	64	63	66	80	97	108	101	92
Derailments	324	312	295	339	292	348	327	254
Crossing Accidents	923	877	871	937	826	763	691	567
TMC/MWE Collisions/ Derailments	46	73	72	68	81	69	61	53
TOTAL	1,357	1,325	1,304	1,424	1,296	1,288	1,180	966
<u>Train Service Accidents*</u>								
	N/A	N/A	N/A	N/A	N/A	729	614	703
<u>Miscellaneous Incidents</u>								
Fires	502	450	240	246	229	221	273	254
D.C. (leakages etc)	31	30	47	51	107	157	105	288
All Other Incidents*	N/A	N/A	N/A	N/A	N/A	2,886	2,811	2,383
TOTAL						3,264	3,189	2,925
<u>D.C. Related Portion of Major Train Accidents</u>								
Collisions	7	7	14	17	44	65	67	56
Derailments	33	36	43	42	65	132	101	94
Crossing Accidents	3	1	-	2	11	3	8	9

*Beginning with the 1982 Report, the statistical presentation of accident statistics changed. A complete time series is not possible as in earlier years a large portion of the injuries sustained in the above Train Service Accidents were included under Miscellaneous Personal Injuries.

3 CASUALTIES BY ACCIDENT/INCIDENT (1982 & 1983 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Other</u>		<u>Total</u>	
	1982	1983	1982	1983	1982	1983	1982	1983
<u>FATALITIES</u>								
<u>Major Types of Accidents</u>								
Collisions	-	3	-	4	-	-	-	7
Derailments	-	-	-	-	-	-	-	-
Crossing Accidents	1	-	-	-	76	58	77	58
TMC/MWE Collisions/ Derailments	4	1	-	-	-	-	4	1
<u>Train Service Accidents</u>	7	6	-	-	50	47	57	53
<u>Miscellaneous Incidents</u>								
Fires	-	-	-	-	-	-	-	-
D.C. Incidents	-	-	-	-	-	-	-	-
All Other Incidents	5	6	1	-	2	-	8	6
TOTAL	17	16	1	4	128	105	146	125

INJURIES

<u>Major Types of Accidents</u>								
Collisions	48	85	99	78	-	-	147	163
Derailments	51	22	44	20	-	-	95	42
Crossing Accidents	30	30	34	6	293	250	357	286
TMC/MWE Collisions/ Derailments	59	74	-	-	2	-	61	74
<u>Train Service Accidents</u>	515	587	1	-	40	65	556	652
<u>Miscellaneous Incidents</u>								
Fires	6	5	-	-	-	-	6	5
D.C. Incidents	1	7	-	-	-	-	1	7
All Other Incidents	2,252	1,848	489	431	2	3	2,743	2,282
TOTAL	2,962	2,658	667	535	337	318	3,966	3,511

1.4 CASUALTIES BY TYPE OF PERSON (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Fatalities</u>								
Passengers	1	-	-	-	-	1	1	4
Employees	8	7	9	10	10	13	17	16
Other	<u>173</u>	<u>134</u>	<u>143</u>	<u>141</u>	<u>179</u>	<u>140</u>	<u>128</u>	<u>105</u>
TOTAL	182	141	152	151	189	154	146	125
<u>Injuries</u>								
Passengers	523	324	420	400	334	636	667	535
Employees	2,940	2,754	2,909	3,358	3,137	3,189	2,962	2,658
Other	<u>590</u>	<u>403</u>	<u>437</u>	<u>453</u>	<u>428</u>	<u>412</u>	<u>337</u>	<u>318</u>
TOTAL	4,053	3,481	3,766	4,211	3,899	4,237	3,966	3,511

SECTION 2

COLLISIONS

SECTION 2

COLLISIONS

(Involving Train Movements Only)

Accidents

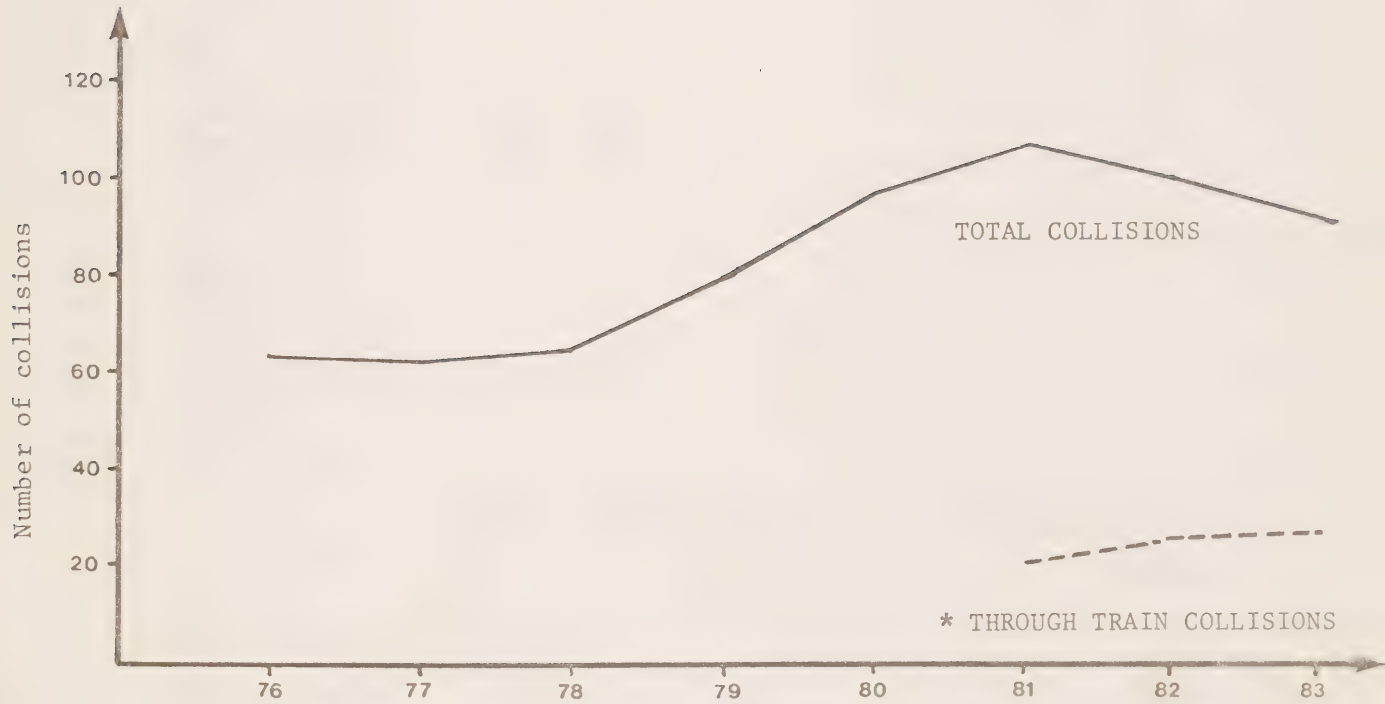
A train collision is an accident where a moving train, engine or car comes in contact with another train, engine or car. Collisions on main track with railway property damage above \$750 (or on any track if involving dangerous goods traffic or casualty) are reportable.

Train collisions totalled 92 in 1983: an 8.9% reduction from 1982. Yard movements accounted for just over two-thirds of these, 16.0% lower than in 1982. Collisions involving through trains increased by 11.5% in 1983. Of the 29 through train collisions in 1983, 5 involved passenger trains as compared to 2 in 1982. Just over 60 per cent of the 92 collisions in 1983 involved cars carrying dangerous commodities, a 16.4% decrease from 1982. Nearly 80% of the DC related collisions occurred in yards during switching operations. The majority of all collisions are due to employee failure -- violation of operating rules and regulations. The rest relate to mechanical failure or vandalism. The number of through train collisions per million train miles was 0.38 in 1983 as compared to 0.35 in 1982.

Casualties

Total injuries numbered 163 in 1983, which is 16 more than the total in 1982. There were seven collision related fatalities in 1983 as compared to none in 1982. The main reason for this was a collision on March 23, 1983 when a VIA Rail dayliner ran through a switch left open in error and hit a group of stationary cars at an industrial siding at Wessex, Alberta resulting in the death of one employee and four passengers.

NUMBER OF COLLISIONS 1976 - 1983



* Separate figures are not available for through train collisions in prior years.

SECTION 2

COLLISIONS
(Involving Train Movements Only)

2.1 NUMBER OF COLLISIONS (1982 and 1983 Summary)

	<u>All Collisions</u>		<u>D.C. Related Collisions</u>	
	1982	1983	1982	1983
<u>CN</u>				
Through Trains	15	18	6	7
Yard Movements	44	43	34	33
TOTAL	59	61	40	40
<u>CP</u>				
Through Trains	9	9	3	5
Yard Movements	29	18	23	10
TOTAL	38	27	26	15
<u>Other</u>				
Through Trains	2	2	-	-
Yard Movements	2	2	1	1
TOTAL	4	4	1	1

	<u>% Change</u>			<u>% Change</u>		
<u>All Railways</u>						
Through Trains	26	29	11.5	9	12	33.3
Yard Movements	75	63	-16.0	58	44	-24.1
TOTAL	101	92	-8.9	67	56	-16.4

2.2 COLLISION CASUALTIES (1982 and 1983 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Total</u>	
	1982	1983	1982	1983	1982	1983
<u>FATALITIES</u>						
CN	-	2	-	-	-	2
CP	-	1	-	4	-	5
Other	-	-	-	-	-	-
	<hr/>		<hr/>		<hr/>	
All Railways	-	3	-	4	-	7
<u>INJURIES</u>						
CN	28	39	99	56	127	95
CP	16	26	-	8	16	34
Other	4	20	-	14	4	34
	<hr/>		<hr/>		<hr/>	
All Railways	48	85	99	78	147	163

2.3 NUMBER OF COLLISIONS AND CASUALTIES 1976-1983

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Number of Collisions</u>								
CN	38	40	50	46	47	69	59	61
CP	22	21	14	29	44	36	38	27
Other	<u>4</u>	<u>2</u>	<u>2</u>	<u>5</u>	<u>6</u>	<u>3</u>	<u>4</u>	<u>4</u>
All Railways	64	63	66	80	97	108	101	92
<u>Number of Casualties</u>								
<u>Fatalities</u>								
CN	1	-	-	1	-	3	-	2
CP	-	1	-	2	1	-	-	5
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
All Railways	1	1	-	3	1	3	-	7
<u>Injuries</u>								
CN	70	84	81	48	31	47	127	95
CP	8	4	-	15	21	19	16	34
Other	<u>5</u>	<u>-</u>	<u>2</u>	<u>9</u>	<u>9</u>	<u>1</u>	<u>4</u>	<u>34</u>
All Railways	83	88	83	72	61	67	147	163

2.4 THROUGH TRAIN COLLISIONS PER MILLION TRAIN MILES (MTM) (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>CN</u>								
Total Collisions	38	40	50	46	47	69	59	61
Through Train Collisions*						13	15	18
MTM	51.7	50.7	50.3	41.4	37.9	36.4	30.6	32.7
Through Train Collisions Per MTM						.36	.49	.55
<u>CP</u>								
Total Collisions	22	21	14	29	44	36	38	27
Through Train Collisions*						8	9	9
MTM	28.7	29.2	29.9	27.6	27.0	27.2	24.4	24.8
Through Train Collisions Per MTM						.29	.37	.36
<u>Other</u>								
Total Collisions	4	2	2	5	6	3	4	4
Through Train Collisions*						2	2	2
MTM	10.0	10.3	9.5	22.6	24.4	22.3	18.9	19.3**
Through Train Collisions Per MTM						.09	.11	.10**
<u>All Railways</u>								
Total Collisions	64	63	66	80	97	108	101	92
Through Train Collisions*						22	26	29
MTM	90.5	90.3	89.7	91.6	89.2	85.8	73.9	76.8**
Through Train Collisions per MTM						.26	.35	.38**

* Separate figures are not available for train collisions in prior years.

** Estimated.

SECTION 3

DERAILMENTS

SECTION 3

DERAILMENTS

(Involving Train Movements Only)

Accidents

A train derailment is an accident where any moving train, engine or car is derailed. Reporting criteria are the same as for collisions. However, unlike collisions, most reportable derailments occur on through trains as opposed to yard movements.

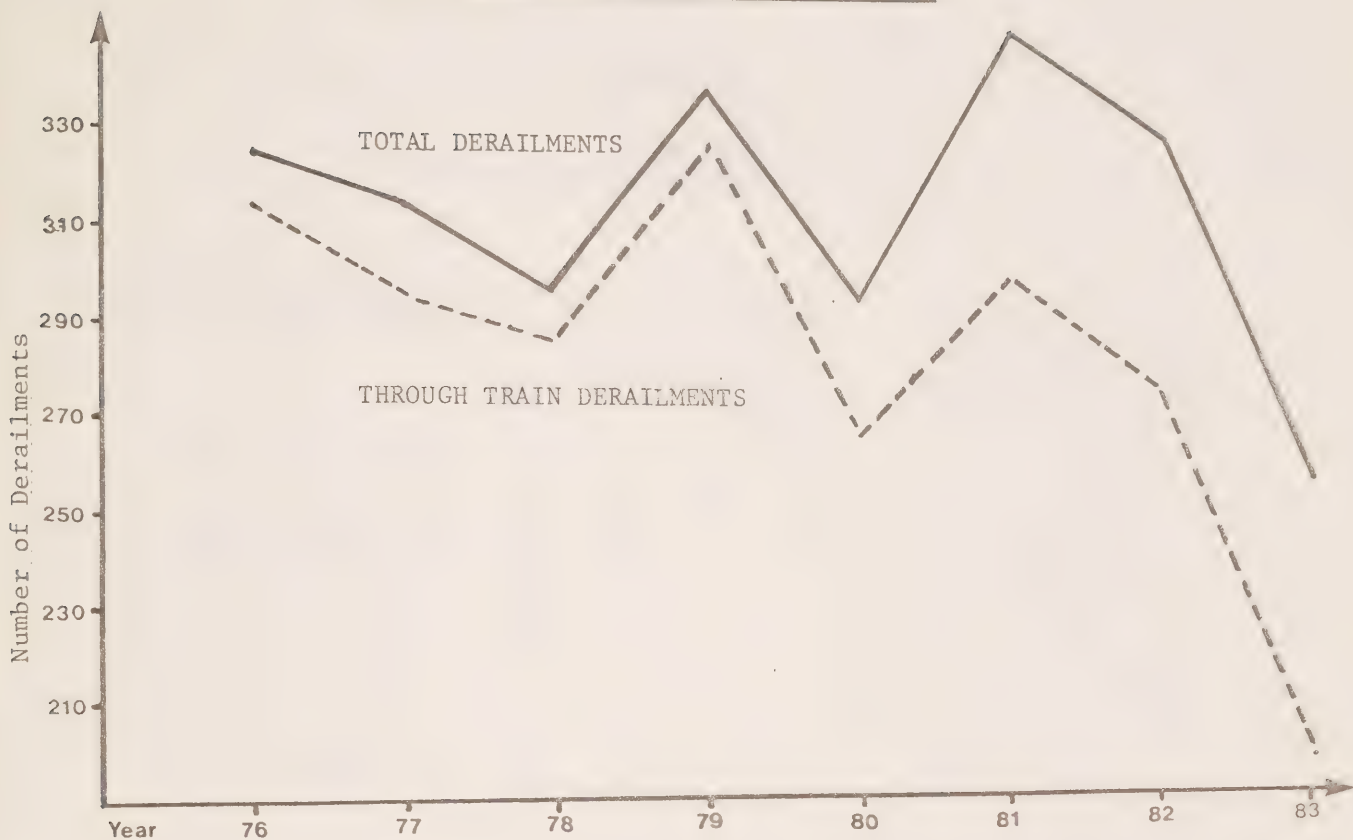
In 1983, derailments totalled 254, a 22.3% improvement on the 1982 total. Railway traffic in terms of Gross Ton-Miles increased by some 9 per cent during the same period. Nearly 80% of these derailments occurred on through trains, 26.4% lower than a year previously. Derailment of yard movements decreased by 1.9%. Of the 201 through train derailments in 1983, 6 involved passenger trains. In 1982, these figures were 273 and 13 respectively. Over one-third of all train derailments in 1983 involved cars carrying dangerous commodities. Total D.C. related cases decreased by 6.9% over the year. Just over one-half of all DC related derailments in 1983 occurred in yards. The number of through train derailments per billions of Gross Ton Miles was 0.66 in 1983 as compared to 0.98 in 1982.

Four-tenths of 1983 derailments had track related (or climatological) causes. The remaining 60 per cent of derailments were evenly split between those caused by equipment defects and those due to operations related causes. Derailments in all categories showed improvements in 1983.

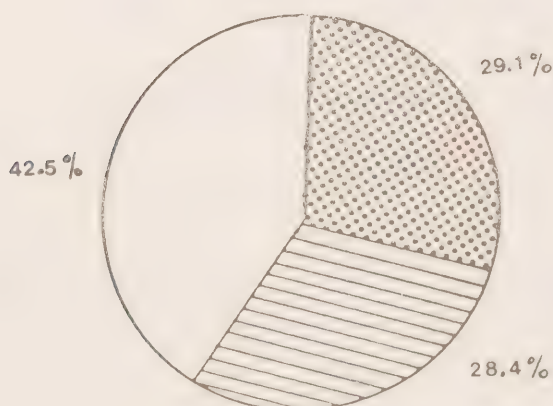
Casualties

Derailments as a rule are not serious in terms of fatalities; in the past year the number of injuries decreased by 55.8% from 95 to 42.

NUMBER OF DERAILMENTS 1976 - 1983



DERAILMENTS BY CAUSE 1983



TOTAL NUMBER OF DERAILMENTS 254



SECTION 3

DERAILMENTS

(Involving Train Movements Only)

3.1 NUMBER OF DERAILMENTS (1982 and 1983 Summary)

	<u>All Derailments</u>		<u>D.C. Related Only</u>			
	1982	1983	1982	1983		
<u>CN</u>						
Through Trains	176	138	29	28		
Yard Movements	<u>20</u>	<u>31</u>	<u>15</u>	<u>29</u>		
TOTAL	196	169	44	57		
<u>CP</u>						
Through Trains	89	55	26	15		
Yard Movements	<u>22</u>	<u>9</u>	<u>20</u>	<u>8</u>		
TOTAL	111	64	46	23		
<u>Other</u>						
Through Trains	8	8	-	2		
Yard Movements	<u>12</u>	<u>13</u>	<u>11</u>	<u>12</u>		
TOTAL	20	21	11	14		
<hr/> <hr/>						
	<u>% Change</u>		<u>% Change</u>			
<u>All Railways</u>						
Through Trains	273	201	-26.4	55	45	-18.2
Yard Movements	<u>54</u>	<u>53</u>	<u>- 1.9</u>	<u>46</u>	<u>49</u>	<u>6.5</u>
TOTAL	327	254	-22.3	101	94	- 6.9

3.2 DERAILMENT CASUALTIES (1982 and 1983 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Total</u>	
	1982	1983	1982	1983	1982	1983
<u>FATALITIES</u>						
CN	-	-	-	-	-	-
CP	-	-	-	-	-	-
Other	-	-	-	-	-	-
	<hr/>		<hr/>		<hr/>	
All Railways	-	-	-	-	-	-
<u>INJURIES</u>						
CN	33	17	13	14	46	31
CP	18	4	31	-	49	4
Other	-	1	-	6	-	7
	<hr/>		<hr/>		<hr/>	
TOTAL	51	22	44	20	95	42

3.3 DERAILMENTS BY CAUSE (1982 and 1983)

<u>CN</u>	<u>Through Trains</u>		<u>Yard Movements</u>		<u>Total</u>	
	1982	1983	1982	1983	1982	1983
Track Related	79	59	8	11	87	70
Equipment Related	55	48	2	1	57	49
Operations Related	42	31	10	19	52	50
Undetermined	-	-	-	-	-	-
TOTAL	176	138	20	31	196	169
<u>CP</u>						
Track Related	33	26	4	2	37	28
Equipment Related	20	20	-	-	20	20
Operations Related	34	9	18	7	52	16
Undetermined	2	-	-	-	2	-
TOTAL	89	55	22	9	111	64
<u>Other</u>						
Track Related	7	4	5	6	12	10
Equipment Related	-	4	1	1	1	5
Operations Related	1	-	6	6	7	6
Undetermined	-	-	-	-	-	-
TOTAL	8	8	12	13	20	21
		% Change			% Change	% Change

All Railways

Track Related	119	89	- 25.2	17	19	11.8	136	108	- 20.6
Equipment Related	75	72	- 4.0	3	2	-33.3	78	74	- 5.1
Operations Related	77	40	- 48.1	34	32	- 5.9	111	72	- 35.1
Undetermined	2	-	-100.0	-	-	-	2	-	-100.0
TOTAL	273	201	- 26.4	54	53	- 1.9	327	254	- 22.3

3.4 NUMBER OF DERAILMENTS (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>CN</u>								
Through Trains	200	180	181	232	186	204	176	138
Yard Movements	<u>6</u>	<u>10</u>	<u>7</u>	<u>7</u>	<u>23</u>	<u>32</u>	<u>20</u>	<u>31</u>
TOTAL	206	190	188	239	209	236	196	169
<u>CP</u>								
Through Trains	99	99	84	90	70	82	89	55
Yard Movements	<u>5</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>13</u>	<u>22</u>	<u>9</u>
TOTAL	104	105	86	92	72	95	111	64
<u>Other</u>								
Through Trains	13	16	20	6	9	11	8	8
Yard Movements	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>6</u>	<u>12</u>	<u>13</u>
TOTAL	14	17	21	8	11	17	20	21
<u>All Railways</u>								
Through Trains	312	295	285	328	265	297	273	201
Yard Movements	<u>12</u>	<u>17</u>	<u>10</u>	<u>11</u>	<u>27</u>	<u>51</u>	<u>54</u>	<u>53</u>
TOTAL	324	312	295	339	292	348	327	254

3.5 DERAILMENT CASUALTIES (1976 - 1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Fatalities</u>								
CN	-	1	2	-	-	-	-	-
CP	2	-	-	1	-	-	-	-
Other	-	-	-	-	-	-	-	-
	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
All Railways	2	1	2	1	-	-	-	-
<u>Injuries</u>								
CN	127	37	25	40	77	83	46	31
CP	57	14	2	33	25	8	49	4
Other	2	-	4	-	1	1	-	7
	<u>2</u>	<u>-</u>	<u>4</u>	<u>-</u>	<u>1</u>	<u>1</u>	<u>-</u>	<u>7</u>
All Railways	186	51	31	73	103	92	95	42

.6

THROUGH TRAIN DERAILMENTS PER BILLION GROSS TON-MILES (BGTM) (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>CN</u>								
Total Derailments	206	190	188	239	209	236	196	170
Through Train Derailments	200	180	181	232	186	204	176	138
BGTM	146.0	147.7	153.6	156.6	161.0	159.4	143.3	160.6
Through Train Derailments Per BGTM	1.37	1.22	1.18	1.48	1.16	1.28	1.23	.86
<u>CP</u>								
Total Derailments	104	105	86	92	72	95	111	64
Through Train Derailments	99	99	84	90	70	82	89	55
BGTM	101.0	106.2	112.1	114.8	114.0	119.4	112.8	119.6
Through Train Derailments Per BGTM	.98	.93	.75	.78	.61	.69	.79	.46
<u>Other</u>								
Total Derailments	14	17	21	8	11	17	20	21
Through Train Derailments	13	16	20	6	9	11	8	8
BGTM	35.5	37.1	28.0	44.6	40.1	30.9	23.4	25.8*
Through Train Derailments Per BGTM	.37	.43	.71	.13	.22	.36	.34	.31*
<u>All Railways</u>								
Total Derailments	324	312	295	339	292	348	327	254
Through Train Derailments	312	295	285	328	265	297	273	201
BGTM	282.6	291.0	293.8	316.1	316.1	309.7	279.6	306.0*
Through Train Derailments Per BGTM	1.10	1.01	.97	1.04	.84	.96	.98	.66*

Estimated

SECTION 4

CROSSING ACCIDENTS

SECTION 4

CROSSING ACCIDENTS

Accidents

A crossing accident is one where any unit of rolling stock on the rails strikes or is struck by a user of a public, private or farm crossing, and damage or injury results.

There were a total of 567 crossing accidents in 1983; a marked improvement of 17.8% over 1982. The number of Railway train-miles performed increased by nearly 4 per cent over the year. The majority of all crossing accidents are at public crossings. The 536 such accidents in 1983 were 17.5 lower than in 1982. Accidents at private crossings also decreased by 12.5%. Only 43% of the total crossing accidents in 1983 actually resulted in casualties; these were 13.5% lower than in 1982 while non-casualty accidents declined by 21.0%. There were 39 crossing accidents per million motor vehicle registrations in 1983 which was an 18.8% improvement over 1982. The ratio of crossing accidents per million train miles was 7.40 in 1983 as compared to a figure of 9.35 a year previously.

Other major points of note with respect to 1983 crossing accidents:

- nearly half the number of crossing accidents in 1983 occurred at unprotected public crossings while 46% occurred at protected public crossings. The remainder occurred at private and farm crossings.
- as a rule, the majority of crossing accidents do not result in any casualties. In 1983, 34% of all crossing accidents resulted in injuries of any kind while only 9% resulted in fatalities.
- 42% of all crossing accidents occurred in the winter months of January, February, March and December.
- In absolute numbers, Ontario, Quebec and Alberta accounted for over two-thirds of 1983 crossing accidents. However, these three provinces also account for half of the total number of crossings in Canada.
- Based on a 94% sample of all crossing accidents, over two-thirds of the crossing accidents occurred during the day. This relates to less traffic at night.
- Approximately two-thirds of the crossing accident sample involved a train striking a vehicle.
- 86% involved freight trains and 11% passenger trains. The rest involved movements of track motor cars and maintenance of way equipment.

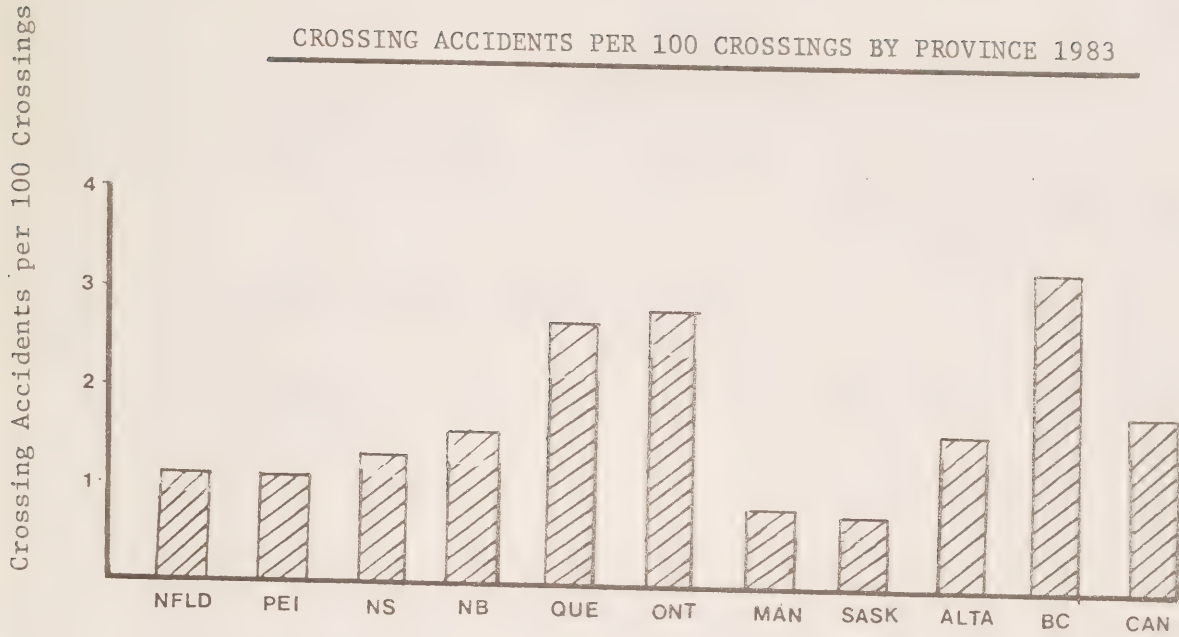
Casualties

Most fatalities in railway accidents are at crossings but are neither railway employees or passengers. In 1983, 93% of crossing fatalities were motor

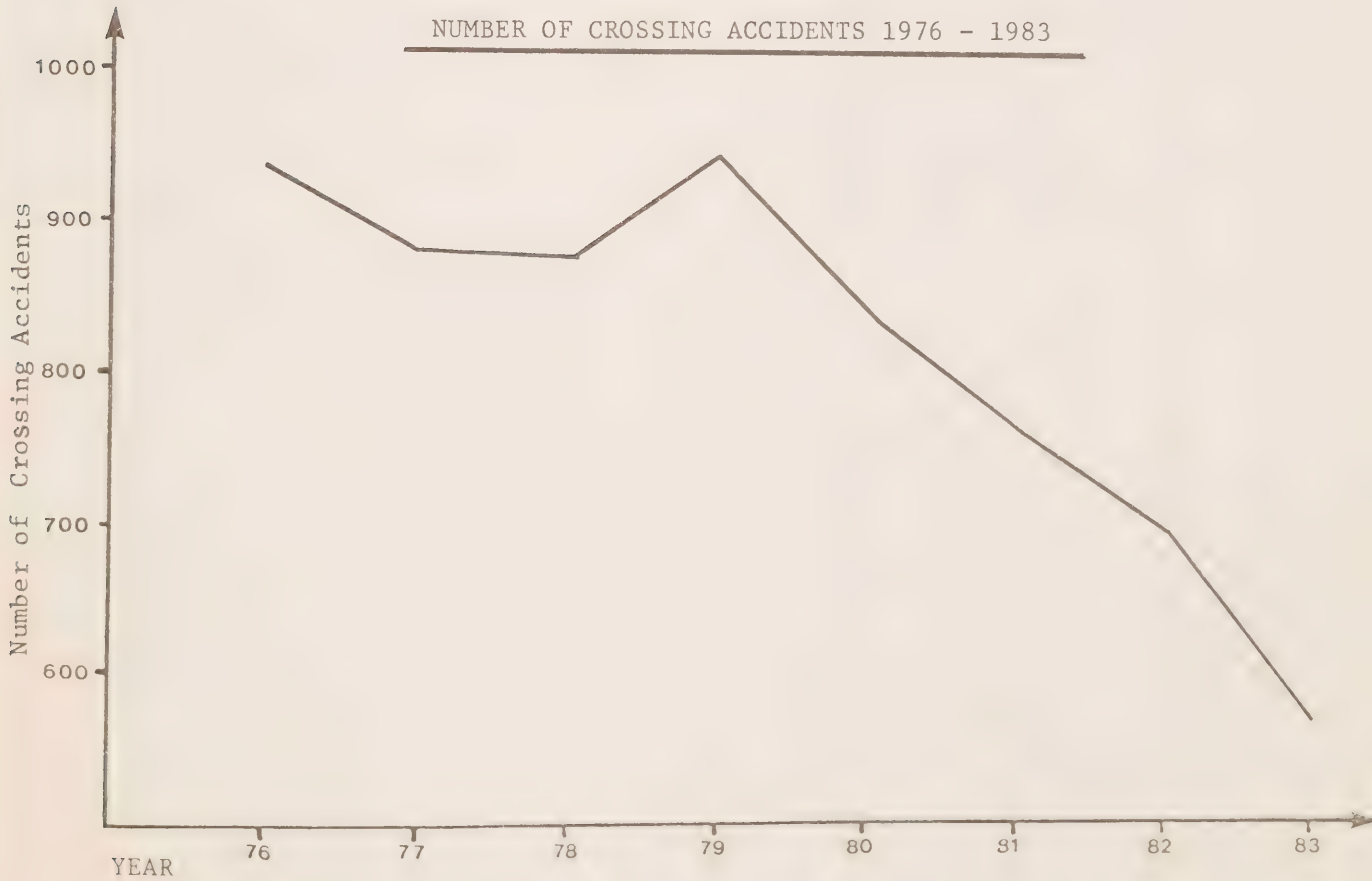
vehicle occupants; the remainder being pedestrians. There were a total of 58 crossing fatalities in 1983, a 24.7% decline from 1982.

Motor vehicle occupants also accounted for some 85% of total injuries at railway crossings. Railway employees accounted for a further 10%. In total there were 286 crossing accident injuries in 1983, a decline of 19.9% from 1982.

CROSSING ACCIDENTS PER 100 CROSSINGS BY PROVINCE 1983



NUMBER OF CROSSING ACCIDENTS 1976 - 1983



SECTION 4

CROSSING ACCIDENTS

.1 CROSSING ACCIDENTS BY RAILWAY (1983 Summary)

	CN	CP	OTHER	ALL RAILWAYS TOTAL %	
<u>Crossing Accidents by Type of Crossing</u>					
Protected	136	106	21	263	46
Unprotected	151	103	19	273	48
Farm Crossing	1	2	1	4	1
Private Crossing	24	3	-	27	5
TOTAL	312	214	41	567	100
<u>Crossing Accidents by Type of Casualty</u>					
Resulting in Injury	117	60	16	193	34
Resulting in Fatality	24	24	2	50	9
Non-Casualty	171	130	23	324	57
TOTAL	312	214	41	567	100
<u>Crossing Accidents by Time of Year</u>					
Jan.-March, Dec.	132	93	15	240	42
Apr.-Nov.	180	121	26	327	58
TOTAL	312	214	41	567	100
<u>Crossing Accidents by Province</u>					
Nfld.	4	-	-	4	1
PEI	3	-	-	3	1
NS	11	3	-	14	2
NB	8	6	-	14	2
Que.	72	22	1	95	17
Ont.	114	77	35	226	40
Man.	16	14	-	30	5
Sask.	29	22	-	51	9
Alta.	34	43	-	77	14
BC	21	27	5	53	9
Yukon	-	-	-	-	-
N.W.T.	-	-	-	-	-
TOTAL	312	214	41	567	100

	CN	CP	OTHER	ALL RAILWAYS TOTAL %	
<u>Crossing Accidents by Time of Day*</u>					
Day	195	142	27	364	68
Night	101	58	13	172	32
TOTAL	296	200	40	536*	100
<u>Crossing Accidents by Type of Collision*</u>					
Train Struck Vehicle	208	129	25	362	68
Vehicle Struck Train	88	71	15	174	32
TOTAL	296	200	40	536*	100
<u>Crossing Accidents by Type of Rolling Stock*</u>					
Passenger	29	13	1	43	8
RDC	4	10	4	18	3
Freight	253	165	35	453	85
Plow	3	1	-	4	1
TMC	5	5	-	10	2
Highrail	2	-	-	2	-
M.W.E.	-	6	-	6	1
TOTAL	296	200	40	536*	100

* Based on a 94 per cent sample of all crossing accidents in 1983

.2 CROSSING ACCIDENTS (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Casualty Accidents</u>								
Public Crossings	375	318	298	350	318	287	240	214
Private Crossings	43	32	28	37	27	25	32	25
Farm Crossings	<u>10</u>	<u>9</u>	<u>10</u>	<u>7</u>	<u>7</u>	<u>6</u>	<u>9</u>	<u>4</u>
TOTAL	428	359	336	394	352	318	281	243
<u>Non-Casualty Accidents</u>								
Public Crossings	495	518	521	525	459	436	410	322
Private Crossings	-	-	14	18	10	4	-	2
Farm Crossings	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>5</u>	<u>5</u>	<u>-</u>	<u>-</u>
TOTAL	495	518	535	543	474	445	410	324
<u>All Accidents</u>								
Public Crossings	870	836	819	875	777	723	650	536
Private Crossings	43	32	42	55	37	29	32	27
Farm Crossings	<u>10</u>	<u>9</u>	<u>10</u>	<u>7</u>	<u>12</u>	<u>11</u>	<u>9</u>	<u>4</u>
TOTAL	923	877	871	937	826	763	691	567

3

CROSSING CASUALTIES (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Fatalities</u>								
Motor Vehicle Occupants	106	80	87	90	70	78	72	54
Railway Employees	-	1	2	-	1	1	1	-
Railway Passengers	-	-	-	-	-	-	-	-
Pedestrians	<u>2</u>	<u>6</u>	<u>-</u>	<u>8</u>	<u>12</u>	<u>3</u>	<u>4</u>	<u>4</u>
TOTAL	108	87	89	98	83	82	77	58
<u>Injuries</u>								
Motor Vehicle Occupants	458	389	374	402	341	355	290	244*
Railway Employees	57	42	35	39	40	42	30	30
Railway Passengers	7	19	6	3	45	51	34	6
Pedestrians	<u>2</u>	<u>3</u>	<u>-</u>	<u>8</u>	<u>9</u>	<u>3</u>	<u>3</u>	<u>6</u>
TOTAL	524	453	415	452	435	451	357	286

*Includes 1 contractor

.4 CROSSING ACCIDENTS PER a) MILLION MOTOR VEHICLE REGISTRATIONS (1976-1983)
b) MILLION TRAIN MILES

	<u>Total Number of Crossing Accidents</u>	<u>Motor Vehicle Registrations (Millions)</u>	<u>Crossing Accidents per Million Motor Vehicle Registrations</u>	<u>Million Train Miles</u>	<u>Crossing Accidents per Million Train Miles</u>
1976	923	11.8	78	90.5	10.20
1977	877	12.5	70	90.3	9.71
1978	871	13.0	67	89.7	9.71
1979	937	13.3	70	91.6	10.23
1980	826	13.7	60	89.2	9.26
1981	763	13.9	55	85.8	8.89
1982	691	14.3	48	73.9	9.35
1983	567	14.6*	39*	76.8*	7.40*

*Estimated.

SECTION 5

TRACK MOTOR CAR AND
MAINTENANCE OF WAY EQUIPMENT COLLISIONS/DERAILMENTS

SECTION 5

TRACK MOTOR CAR AND MAINTENANCE OF WAY EQUIPMENT COLLISIONS/DERAILMENTS

Accidents

This section examines collisions/derailments involving on-track work equipment such as track motor cars and maintenance of way equipment.

Collisions between or involving such equipment numbered 36 in 1983, which was 16.3% lower than in 1982.

There were 17 on-track equipment derailments in 1983 as compared to 18 in 1982. Most of these derailments involved track motor cars.

Casualties

In 1983, on-track equipment collisions/derailments resulted in one fatality and 74 injuries. Collisions accounted for nearly two-thirds of all injuries. In 1982 these types of accidents resulted in 4 fatalities and 61 injuries.

SECTION 5

TRACK MOTOR CAR (TMC) AND MAINTENANCE OF WAY EQUIPMENT (MWE)
COLLISIONS/DERAILMENTS

1 NUMBER OF COLLISIONS AND CASUALTIES (1982 and 1983 SUMMARY)

	<u>Collisions</u>		<u>Casualties*</u>			
	1982	1983	<u>Injured</u>		<u>Killed</u>	
			1982	1983	1982	1983
<u>TMC-TMC, TMC-MWE and MWE-MWE</u>						
CN	10	8	9	15	2	-
CP	4	8	5	15	-	-
Other	-	-	-	-	-	-
TOTAL	14	16	14	30	2	-
<u>TMC-Train and MWE-Train</u>						
CN	20	13	13	15	2	-
CP	8	6	3	3	-	-
Other	1	1	-	-	-	-
TOTAL	29	20	16	18	2	-

% Change

TOTAL All Types

CN	30	21	-30.0	22	30	4	-
CP	12	14	16.7	8	18	-	-
Other	1	1	0.0	-	-	-	-
TOTAL	43	36	-16.3	30	48	4	-

11 casualties are employees.

5.2 TOTAL OF ALL TMC AND MWE: COLLISIONS AND CASUALTIES (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Collisions</u>								
CN	18	33	32	22	25	34	30	21
CP	8	15	12	9	16	16	12	14
Other	<u>3</u>	<u>7</u>	<u>6</u>	<u>5</u>	<u>8</u>	<u>3</u>	<u>1</u>	<u>1</u>
TOTAL	29	55	50	36	49	53	43	35
<u>Casualties</u>								
<u>Fatalities</u>								
CN	-	-	-	-	1	-	4	-
CP	-	-	1	-	1	1	-	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	-	-	1	-	2	1	4	-
<u>Injuries</u>								
CN	21	34	50	30	25	65	22	30
CP	27	15	10	19	18	14	8	18
Other	<u>5</u>	<u>4</u>	<u>5</u>	<u>8</u>	<u>17</u>	<u>4</u>	<u>-</u>	<u>-</u>
TOTAL	53	53	65	57	60	83	30	48

5.3 NUMBER OF DERAILMENTS AND CASUALTIES (1982 and 1983 Summary)

	<u>Derailments</u>		<u>Casualties</u>			
	1982	1983	<u>Injuries</u>		<u>Fatalities</u>	
			1982	1983	1982	1983
<u>TMC</u>						
CN	2	3	3	6	-	-
CP	10	12	18*	18	-	1
Other	2	-	6	-	-	-
TOTAL	14	15	27*	24	-	1
<u>MWE</u>						
CN	2	-	2	-	-	-
CP	2	2	2	2	-	-
Other	-	-	-	-	-	-
TOTAL	4	2	4	2	-	-

% Change

TOTAL All Types

CN	4	3	- 25.0	5	6	-	-
CP	12	14	16.7	20*	20	-	1
Other	2	-	-100.0	6	-	-	-
TOTAL	18	17	- 5.6	31*	26	-	1

* Includes 2 non-employees, all other injuries and fatalities are employees.

5.4 TOTAL OF ALL TMC AND MWE: DERAILEMENTS AND CASUALTIES (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Derailments</u>								
CN	13	11	12	19	6	2	4	3
CP	4	7	10	11	25	11	12	14
Other	-	-	-	2	1	3	2	-
TOTAL	17	18	22	32	32	16	18	17
<u>Casualties</u>								
<u>Fatalities</u>								
CN	-	-	-	1	-	-	-	-
CP	-	-	-	-	-	-	-	1
Other	-	-	-	-	-	1	-	-
TOTAL	-	-	-	1	-	1	-	1
<u>Injuries</u>								
CN	13	22	16	27	8	2	5	6
CP	10	7	13	14	31	12	20	20
Other	-	-	-	7	1	3	6	-
TOTAL	23	29	29	48	40	17	31	26

SECTION 6

TRAIN SERVICE ACCIDENTS

SECTION 6

TRAIN SERVICE ACCIDENTS

Accidents

Train service accidents for 1982 and 1983, as shown in this report, represent persons (including trespassers) sustaining injuries or dying as a result of being struck by rolling stock or employees injured while in the process of entraining/detraining rolling stock.

In 1983, there were 703 train service accidents and this was 14.5% higher than the figure in 1982. Four-fifths of these involved railway employees getting off/on rolling stock.

Casualties

Train service accidents accounted for 53 fatalities in 1983 (this was 42% of all railway accident fatalities). Most of these fatalities were trespassers and suicides. Train service fatalities dropped by 7.0% over the year. This category of accidents also resulted in 652 injuries in 1983, as compared to 556 in 1982. The majority of these are injuries to employees getting off/on rolling stock.

SECTION 6

TRAIN SERVICE ACCIDENTS

6.1 TRAIN SERVICE ACCIDENTS AND CASUALTIES (1982 and 1983 Summary)

	<u>1982</u>	<u>1983</u>	<u>% Change</u>
<u>Accidents</u>			
Employees struck by Rolling Stock	28	35	25.0
Passengers struck by Rolling Stock	1	-	-100.0
Trespassers struck by Rolling Stock	91	111	22.0
Employees getting off/on Rolling Stock	<u>494</u>	<u>557</u>	<u>12.8</u>
TOTAL	614	703	14.5
<u>Casualties</u>			
i) <u>Fatalities</u>			
Employees struck by Rolling Stock	7	6	
Passengers struck by Rolling Stock	-	-	
Trespasser struck by Rolling Stock	50	47	
Employees getting off/on Rolling Stock	<u>-</u>	<u>-</u>	
TOTAL	57	53	
ii) <u>Injuries</u>			
Employees struck by Rolling Stock	21	30	
Passengers struck by Rolling Stock	1	-	
Trespasser struck by Rolling Stock	40	65	
Employees getting off/on Rolling Stock	<u>494</u>	<u>557</u>	
TOTAL	556	652	

6.2 TRAIN SERVICE ACCIDENTS AND CASUALTIES

1976 1977 1978 1979 1980 1981 1982 1983

Accidents

Employees struck by Rolling Stock*	84	52	51	48	32	28**	29	35
Trespassers struck by Rolling Stock	84	82	105	82	177	109	91	111
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>592</u>	<u>494</u>	<u>557</u>

TOTAL

729**614 703

Casualties

Fatalities

Employees struck by Rolling Stock*	-	2	5	5	6	4**	7	6
Trespassers struck by Rolling Stock	32	44	54	51	97	58	50	47
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>-</u>	<u>-</u>	<u>-</u>

TOTAL

62** 57 53

Injuries

Employees struck by Rolling Stock*	13	3	29	46	25	24	22	30
Trespassers struck by Rolling Stock	52	38	51	34	80	46	40	65
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>592</u>	<u>494</u>	<u>557</u>

TOTAL

662 556 652

* These totals may include the rare case of a passenger being struck by rolling stock.

** Includes 1 non-employee accident.

*** See footnote to Table 1.2.

SECTION 7

MISCELLANEOUS INCIDENTS

SECTION 7

MISCELLANEOUS INCIDENTS

Incidents

Miscellaneous incidents include fires, cases of dangerous commodity leakages (not always related to train movements) and other incidents of a diverse nature. Examples of the latter category include:

- personal injuries to employees or passengers such as striking against or being hit by an obstacle; burns; exposure; sprains, inhalation; etc.
- disruptions of service, washouts, obstructions to track, not resulting in a train accident.
- damage to bridges, culverts, other structures not due to train accidents but including fire damage.

There were 254 fires in 1983 which is a decrease of 7.0 from 1982. The majority of fires are on right of way and these in turn are dependent on climatic conditions and to a lesser degree on vandalism.

D.C. leakage incidents in this section are specifically those that arise in the transportation of dangerous commodities other than due to train accidents. The latter are already included in the figures presented in earlier sections of this report. D.C. leakages totalled 288 in 1983. The considerable increase over the 1982 figure of 105 relates to more stringent inspection and the considerable increase in D.C. traffic in recent years.

All other incidents amounted to 2,383 in 1983, compared to 2,811 in 1982. 94% of these incidents were miscellaneous injuries sustained by employees and passengers not related to train accidents.

Casualties

Fires and D.C. incidents accounted for only 12 injuries in 1983. The vast majority of the 2,294 miscellaneous incident injuries were due to "other incidents" as defined earlier. Four-fifths of these "other incidents" were personal injuries to employees, with passenger injuries accounting for a further 19%. It should be pointed out that there is no minimum severity for reporting. Injuries can range from a loss of a limb to a minor slip or fall.

SECTION 7

MISCELLANEOUS INCIDENTS

7.1 MISCELLANEOUS INCIDENTS AND CASUALTIES (1982 and 1983 Summary)

	<u>Incidents</u>			<u>Fatalities</u>		<u>Injuries</u>	
	1982	1983	% Change	1982	1983	1982	1983
<u>Fires</u>							
Fires on Right of Way	246	221		-	-	-	-
Fires on Rolling Stock	20	24		-	-	6	5
Fires on Structures	7	9		-	-	-	-
TOTAL	273	254	-7.0	-	-	6	5
<u>Dangerous Commodity Incidents*</u>	105	288	174.3	-	-	1	7
<u>Other Miscellaneous Incidents</u>							
Involving Employees only	2,211	1,801		-	-	2,225	1,803
Involving Passengers only	455	431		1	-	489	431
Other Incidents	145	151		7**	6	29**	48**
TOTAL	<u>2,811</u>	<u>2,383</u>	<u>-15.2</u>	<u>8</u>	<u>6</u>	<u>2,743</u>	<u>2,282</u>
TOTAL INCIDENTS	3,189	2,925	- 8.3	8	6	2,750	2,294

* These totals relate to incidents involving the transportation of dangerous commodities other than in train accidents.

** 1982 data includes 2 non-employees, 1983 data includes 3 non-employees.

7.2

MISCELLANEOUS INCIDENTS AND CASUALTIES (1976-1983)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
<u>Incidents</u>								
Fires	502	450	240	246	229	221	273	254
D.C.	31	30	47	51	107	157	105	288
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>
TOTAL						3,264	3,189	2,925
<u>Casualties</u>								
<u>Fatalities</u>								
Fires	-	-	-	-	-	-	-	-
D.C.	-	-	-	-	-	-	-	-
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>5</u>	<u>8</u>	<u>6</u>
TOTAL						5	8	6
<u>Injuries</u>								
Fires	-	-	-	-	-	3	6	5
D.C.	8	1	1	6	23	1	1	7
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,861</u>	<u>2,743</u>	<u>2,282</u>
TOTAL						2,865	2,750	2,294

* See footnote to Table 1.2.

7.2 NOMBRE D'INCIDENTS ET DE VICTIMES (1976 à 1983)

	Incidents							
	1976	1977	1978	1979	1980	1981	1982	1983
Incendies	502	450	240	246	229	221	273	254
Marchandises	31	30	47	51	107	157	105	288
dangereuses	S/O	S/O	S/O	S/O	S/O	2,886	2,811	2,383
Tous les autres	31	30	47	51	107	157	105	288
TOTAL	533	480	287	297	336	378	378	542
Victimes								
Morts	-	-	-	-	-	-	-	-
Incendies	-	-	-	-	-	-	-	-
Marchandises	-	-	-	-	-	-	-	-
dangereuses	-	-	-	-	-	-	-	-
Tous les autres	-	-	-	-	-	-	-	-
TOTAL	-	-	-	-	-	-	-	-
Blessés	-	-	-	-	-	-	-	-
Incendies	-	-	-	-	-	-	-	-
Marchandises	-	-	-	-	-	-	-	-
dangereuses	-	-	-	-	-	-	-	-
Tous les autres	-	-	-	-	-	-	-	-
TOTAL	-	-	-	-	-	-	-	-
* Voir la remarque figurant au tableau 1.2.								

PARTIE 7

INCIDENTS DIVERS

NOMBRE D'INCIDENTS DIVERS ET DE VICTIMES (Relève pour 1982 et 1983)

Incidents	1982	1983	Variation	en %
Morts	1982	1983		
Blessés	1982	1983		

Incidents

Incidents sur

l'emprise

Incidents dans le

matériel roulant

Incidents dans les

structures

TOTAL

Incidents des

marchandises

dangereuses

Autres incidents
divers

Seulement des

employés

Seulement des

passagers

Autres incidents

TOTAL

2,811	2,383	-15.2	8	6	2,743	2,282
145	151		7**	6	29**	48**
455	431		1	-	489	431
2,211	1,801		-	-	2,225	1,803
3,189	2,925	-8.3	8	6	2,750	2,294

NOMBRE TOTAL
D'INCIDENTS

Ces totaux concernent les incidents mettant en cause le transport de marchandises dangereuses, mais qui ne sont pas le résultat d'accidents de train.

Données de 1982 y comprend deux personnes qui ne sont pas des employés, données de 1983 y comprend trois personnes qui ne sont pas des employés.

PARTIE 7

INCIDENTS DIVERS

Incidents

Les incidents divers comprennent les incendies, les fuites de marchandises dangereuses (qui ne sont pas toujours reliées aux trains en déplacement) et les autres incidents de nature diverse. Voici des exemples de cette dernière catégorie:

- les blessures subies par des employés ou des passagers qui se heurtent contre un obstacle ou qui se font frapper, qui subissent des brûlures, des foulures, qui sont exposés à des marchandises dangereuses, qui en inhalent les vapeurs, etc.
- les interruptions de service, les glissements, les obstacles sur la voie, etc. qui ne provoquent pas d'accidents de train.
- les dommages aux ponts, aux ouvrages de drainage et aux autres structures qui ne sont pas causés par des accidents de train, mais qui comprennent les dommages dus à un incendie.

Il y a eu 254 incendies en 1983, soit 7,0 % de moins qu'en 1982. La plupart ont eu lieu sur les emprises et sont attribuables aux conditions atmosphériques ou, à un degré moindre, au vandalisme.

Les fuites de marchandises dangereuses visées dans la présente partie sont très précisément celles qui ont lieu lors du transport de marchandises dangereuses, et qui ne sont pas causées par des accidents de train. Les fuites causées par des accidents de train sont traitées dans les autres parties du présent rapport. Au total, il y a eu 288 fuites de marchandises dangereuses en 1983. L'augmentation des fuites de marchandises dangereuses par rapport à l'année précédente a trait à des inspections plus rigoureuses et l'augmentation considérable dans le trafic de marchandises dangereuses dans les dernières années.

Les autres incidents divers sont au nombre de 2 383 en 1983, comparativement à 2 811 en 1982. De ces incidents, 94 % sont des blessures diverses subies par des employés et des passagers qui ne sont pas victimes d'un accident de train.

Victimes

Seulement douze personnes ont subi des blessures en 1983 à la suite d'incendies ou de fuites de marchandises dangereuses. La plupart des 2 294 victimes d'incidents divers ont subi des blessures de la catégorie des "autres incidents" susmentionnée. Les quatre cinquièmes de ces "autres incidents" consistent en des blessures qui ont été infligées à des employés, tandis que 19 % sont des blessures subies par des passagers. Notons qu'il n'y a pas de critères minimums quant à la sévérité des blessures pour que celles-ci fassent l'objet d'un rapport; on peut donc tout signaler, depuis la simple chute jusqu'à la perte d'un membre.

INCIDENTS DIVERS

PARTIE 7

6.2 NOMBRE D'ACCIDENTS RELATIFS AU SERVICE DE TRAIN ET DES VICTIMES (1976-1983)

Accidents									
Employés frappés par du matériel roulant*									
84	52	51	48	32	28**	29	35		
Intrus frappés par du matériel roulant									
84	82	105	82	177	109	91	111		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	592	494	557	TOTAL	
Victimes									
Morts									
-	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
32	44	54	51	97	58	50	47		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Blessés									
13	3	29	46	25	24	22	30		
Employés frappés par du matériel roulant*									
52	38	51	34	80	46	40	65		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	592	494	557	TOTAL	
Employés frappés par du matériel roulant*									
13	3	29	46	25	24	22	30		
Intrus frappés par du matériel roulant									
52	38	51	34	80	46	40	65		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	592	494	557	TOTAL	
Blessés									
53					62**	57	53		
TOTAL									
Morts									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		
Employés frappés par du matériel roulant*									
-					-	-	-		
Employés descendant de matériel roulant ou y montant***									
S/O	S/O	S/O	S/O	S/O	-	-	-	TOTAL	
Victimes									
Morts									
6	2	5	5	6	4**	7	6		

* Ces totaux peuvent comprendre le cas très rare d'un passager frappé par du matériel roulant.
 ** Y compris un accident qui a fait une victime chez une personne autre qu'un employé.

***Voir la remarque figurant au tableau 1.2

PARTIE 6

ACCIDENTS RELATIFS AU SERVICE DE TRAIN

6.1 NOMBRE D'ACCIDENTS RELATIFS AU SERVICE DE TRAIN ET DE VICTIMES (Relève pour 1982 et 1983)

Accidents			
Variation en %			
1982	1983		
28	35	25.0	
1	-	-100.0	
91	111	22.0	
494	557	12.8	
614	703	14.5	TOTAL
Victimes			
Morts			
Employés frappés par du matériel roulant	7		
Passagers frappés par du matériel roulant	-		
Intrus frappés par du matériel roulant	50		
Employés descendant du matériel roulant ou y montant	-		
57	53		TOTAL
Blessés			
Employés frappés par du matériel roulant	21		
Passagers frappés par du matériel roulant	1		
Intrus frappés par du matériel roulant	40		
Employés descendant du matériel roulant ou y montant	494		
556	652		TOTAL

ACCIDENTS RELATIFS AU SERVICE DE TRAIN

PARTIE 6

- 43 -

Accidents

Comme l'indique le présent rapport, les accidents relatifs au service de train pour 1982 et 1983 concernent les personnes (y compris les intrus) qui ont subi des blessures ou qui sont mortes après avoir été frappées par du matériel roulant ou des employés blessés alors qu'ils montaient dans du matériel roulant ou en descendant.

En 1983, il y a eu 703 accidents relatifs au service de train, soit 14,5 % de plus qu'en 1982. Les quatre cinquièmes de ces accidents touchaient des employés des compagnies ferroviaires qui montaient à bord du matériel roulant ou qui en descendant.

Victimes

Les accidents relatifs au service de train ont fait 53 morts en 1983 (ce qui représente près de 42 % de tous les décès survenus dans des accidents ferroviaires). Dans la plupart des cas, il s'agit de suicides ou d'intrus. Le nombre de morts dus à des accidents relatifs au service de train a tout de même diminué de 7,0 % par rapport à l'année précédente. Ce genre d'accidents a fait 652 blessés en 1983, comparativement à 556 en 1982. Dans la plupart des cas, il s'agissait d'employés qui montaient à bord du matériel roulant ou qui en descendant.

ACCIDENTS RELATIFS AU SERVICE DE TRAIN

PARTIE 6

Déraillements	Victimes				Morts				Blessés				TOTAL			
	CN	CP	Autres	TOTAL	CN	CP	Autres	TOTAL	CN	CP	Autres	TOTAL	CN	CP	Autres	TOTAL
1976	13	4	-	17	-	-	-	-	13	10	-	23	13	10	-	23
1977	11	7	-	18	-	-	-	-	22	7	-	29	22	7	-	29
1978	12	10	-	22	-	-	-	-	16	13	-	29	16	13	-	29
1979	19	11	2	32	1	-	-	1	27	14	7	48	27	14	7	48
1980	6	25	1	32	-	-	-	-	8	31	1	40	8	31	1	40
1981	2	11	3	16	-	-	1	1	2	12	3	17	2	12	3	17
1982	4	12	2	18	-	-	-	-	5	20	6	31	5	20	6	31
1983	3	14	-	17	-	1	-	1	6	20	-	26	6	20	-	26

5.3 NOMBRE DE DÉRAILLEMENTS ET DE VICTIMES (Relève pour 1982 et 1983)

D.				M.E.				TOTAL			
Déraillements				TOTAL				TOTAL			
1982		1983		1982		1983		1982		1983	
Victimes				Blessés				Morts			
CN	2	3		3	6			-	-	-	-
CP	10	12		18*	18			-	-	-	1
Autres	2	-		6	-			-	-	-	-
TOTAL	14	15		27*	24			-	-	-	1
CN	4	3	-25.0	5	6			-	-	-	-
CP	12	14	16.7	20*	20			-	-	-	1
Autres	2	-	-100.0	6	-			-	-	-	-
TOTAL	18	17	-5.6	31*	26			-	-	-	1
Variation en %											
TOTAL pour toutes les sortes											

* Mises à part deux personnes, tous les morts et les blessés sont des employés.

5.2 NOMBRE TOTAL DE COLLISIONS ET DE VICTIMES RELATIVES AUX D. ET M.E. (1976 à 1983)

Collisions		1976	1977	1978	1979	1980	1981	1982	1983
TOTAL	CN	18	33	32	22	25	34	30	21
	CP	8	15	12	9	16	16	12	14
	Autres	3	7	6	5	8	3	1	1
Victimes		29	55	50	36	49	53	43	36
Morts	CN	-	-	-	-	1	-	4	-
	CP	-	-	1	-	1	1	-	-
	Autres	-	-	-	-	-	-	-	-
Blessés		-	-	1	-	2	1	4	-
TOTAL	CN	21	34	50	30	25	65	22	30
	CP	27	15	10	19	18	14	8	18
	Autres	5	4	5	8	17	4	-	-
TOTAL		53	53	65	57	60	83	30	48

PARTIE 5

COLLISIONS/DÉRAILLEMENT DES DRAISINES (D) ET DES MACHINES D'ENTRETIEN DE LA
VOIE (M.E.)

5.1 NOMBRE DE COLLISIONS ET DE VICTIMES (Relève pour 1982 et 1983)

Collisions				Victimes*			
		1982	1983			1982	1983
D.-D., D.-M.F. et M.F.-M.F.							
CN	CP	Autres	TOTAL	D.-Train et M.F.-Train			
				CN	CP	Autres	TOTAL
10	4	-	14	20	8	1	29
8	8	-	16	13	6	1	20
TOTAL				TOTAL			
14	15	2	30	13	3	-	16
9	5	-	14	3	-	-	18
TOTAL				TOTAL			
30	21	1	43	22	8	-	30
12	14	1	36	18	-	-	48
30.0	16.7	0.0	-16.3	4	-	-	4
TOTAL pour tous les types				TOTAL pour tous les types			
Variation en %				Variation en %			

* Tous les morts et blessés sont des employés.

PARTIE 5

COLLISIONS/DÉRAILLEMENTS DES DRAISINES ET DES MACHINES
D'ENTRETIEN DE LA VOIE

Accidents

Cette partie concerne les collisions/dérailllements d'équipement de travail sur la voie, tel que les draisines et des machines d'entretien de la voie.

Le nombre de collisions entre/impliquant de tels véhicules s'éleva à 36 en 1983, c'est-à-dire 16,3 % de moins qu'en 1982.

Dix-sept dérailllements d'équipement, dont la plupart des draisines, acheminé sur la voie ont eu lieu en 1983, comparativement à 18 en 1982.

Victimes

En 1983, les collisions/dérailllements de l'équipement acheminé sur la voie ont fait 1 mort et 74 blessés. Les collisions sont à l'origine de presque deux-tiers de tous les blessés. En 1982, ces accidents avaient fait 4 morts et 61 blessés.

COLLISIONS/DÉRAILLEMENTS DES DRAISINES ET DES MACHINES
D'ENTRETIEN DE LA VOIE

PARTIE 5

4 NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU PAR

a) MILLION DE VÉHICULES À MOTEUR
IMMATRICULÉS
b) MILLION DE TRAINS-MILLES
(1976-1983)

Accidents aux passages à niveau par million de trains-milles	Millions de trains-milles	Accidents aux passages à niveau par million de véhicules à moteur imma-tricules	Véhicules à moteur imma-tricules (en millions)	Nombre Total d'accidents aux passages à niveau	1976	1977	1978	1979	1980	1981	1982	1983
10.20	90.5	78	11.8	923	1976	877	871	937	826	763	691	567
9.71	90.3	70	12.5	871	1977	13.0	13.7	13.3	13.9	14.3	14.6*	14.6*
9.71	89.7	67	13.0	871	1978	70	70	70	60	55	48	39*
9.26	89.2	60	13.7	826	1980	91.6	89.2	85.8	73.9	76.8*	76.8*	76.8*
10.23	91.6	70	13.3	937	1979	10.23	9.26	8.89	9.35	9.71	9.71	9.71
8.89	85.8	55	13.9	763	1981	7.40*	7.40*	7.40*	7.40*	7.40*	7.40*	7.40*
9.35	73.9	48	14.3	691	1982							
7.40*	76.8*	39*	14.6*	567	1983							

Approximatif

4.3 NOMBRE DE VICTIMES D'ACCIDENTS AUX PASSAGES À NIVEAU (1976 à 1983)

	1976	1977	1978	1979	1980	1981	1982	1983
Morts								
Occupants de véhicules à moteur	106	80	87	90	70	78	72	54
Employés de compagnies ferroviaires	-	1	2	-	1	1	1	-
Passagers	-	-	-	-	-	-	-	-
Piétons	2	6	-	8	12	3	4	4
TOTAL	108	87	89	98	83	82	77	58
Blessés								
Occupants de véhicules à moteur	458	389	374	402	341	355	290	244*
Employés de compagnies ferroviaires	57	42	35	39	40	42	30	30
Passagers	7	19	6	3	45	51	34	6
Piétons	2	3	-	8	9	3	3	6
TOTAL	524	453	415	452	435	451	357	286

* Y compris une victime d'accident qui n'est pas un employé.

4.2 NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU (1976 à 1983)

1976	1977	1978	1979	1980	1981	1982	1983
Accidents faisant des victimes							
Passages à niveau publics	375	318	298	350	318	287	240
Passages à niveau privés	43	32	28	37	27	25	32
Passages à niveau de ferme	10	9	10	7	7	6	9
TOTAL	428	359	336	394	352	318	281
Accidents ne faisant aucune victime							
Passages à niveau publics	495	518	521	525	459	436	410
Passages à niveau privés	-	-	14	18	10	4	-
Passages à niveau de ferme	-	-	-	-	5	5	-
TOTAL	495	518	535	543	474	445	410
Tous les accidents aux passages à niveau							
Passages à niveau publics	870	836	819	875	777	723	650
Passages à niveau privés	43	32	42	55	37	29	32
Passages à niveau de ferme	10	9	10	7	12	11	9
TOTAL	923	877	871	937	826	763	691
Tous les accidents							
Passages à niveau publics	870	836	819	875	777	723	650
Passages à niveau privés	43	32	42	55	37	29	32
Passages à niveau de ferme	10	9	10	7	12	11	9
TOTAL	923	877	871	937	826	763	691

Toutes les	CN	CP	Autres	compagnies	ferroviaires	Total	%
------------	----	----	--------	------------	--------------	-------	---

Accidents aux passages à niveau
par province

TOTAL	312	214	41	567	100
T.-N.	4	-	-	4	1
I.P.-E.	3	-	-	3	1
N.-E.	11	3	-	14	2
N.-B.	8	6	-	14	2
Qué.	72	22	1	95	17
Ont.	114	77	35	226	40
Man.	16	14	-	30	5
Sask.	29	22	-	51	9
Alb.	34	43	-	77	14
C.-B.	21	27	5	53	9
Yukon	-	-	-	-	-
T.N.-O.	-	-	-	-	-

Accidents aux passages à niveau selon
le moment du jour

Jour	195	142	27	364	68
Nuit	101	58	13	172	32
TOTAL	296	200	40	536*	100

Accidents aux passages à niveau par
sorte de collision

Véhicule frappé par un train	208	129	25	362	68
Train frappé par un véhicule	88	71	15	174	32
TOTAL	296	200	40	536*	100

Accidents aux passages à niveau par
sorte de matériel roulant*

Train de voyageurs	29	13	1	43	8
Autorails	4	10	4	18	3
Train de marchandises	253	165	35	453	85
Chasse-neige	3	1	-	4	1
Draisines	5	5	-	10	2
Rapide	2	-	-	2	-
Équipement d'entretien de la voie	-	6	-	6	1
TOTAL	296	200	40	536*	100

* Fondé sur un échantillon qui constitue 94 % de tous les accidents aux passages à niveau survenus en 1983.

PARTIE 4

ACCIDENTS AUX PASSAGES À NIVEAU

4.1 NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU PAR COMPAGNIE FERROVIAIRE (Relevé pour 1983)

CN	CP	Autres	Toutes les compagnies ferroviaires	Total	%
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Accidents aux passages à niveau par sorte de passage à niveau

Protégé par des signaux automatiques, etc.

Non-protégé

De ferme

Privé

TOTAL	312	214	41	567	100
136	106	21	263	46	
151	103	19	273	48	
1	2	1	4	1	
24	3	-	27	5	

Accidents aux passages à niveau par type de victimes

Avec blessés

Avec morts

Sans victime

TOTAL	312	214	41	567	100
117	60	16	193	34	
24	24	2	50	9	
171	130	23	324	57	

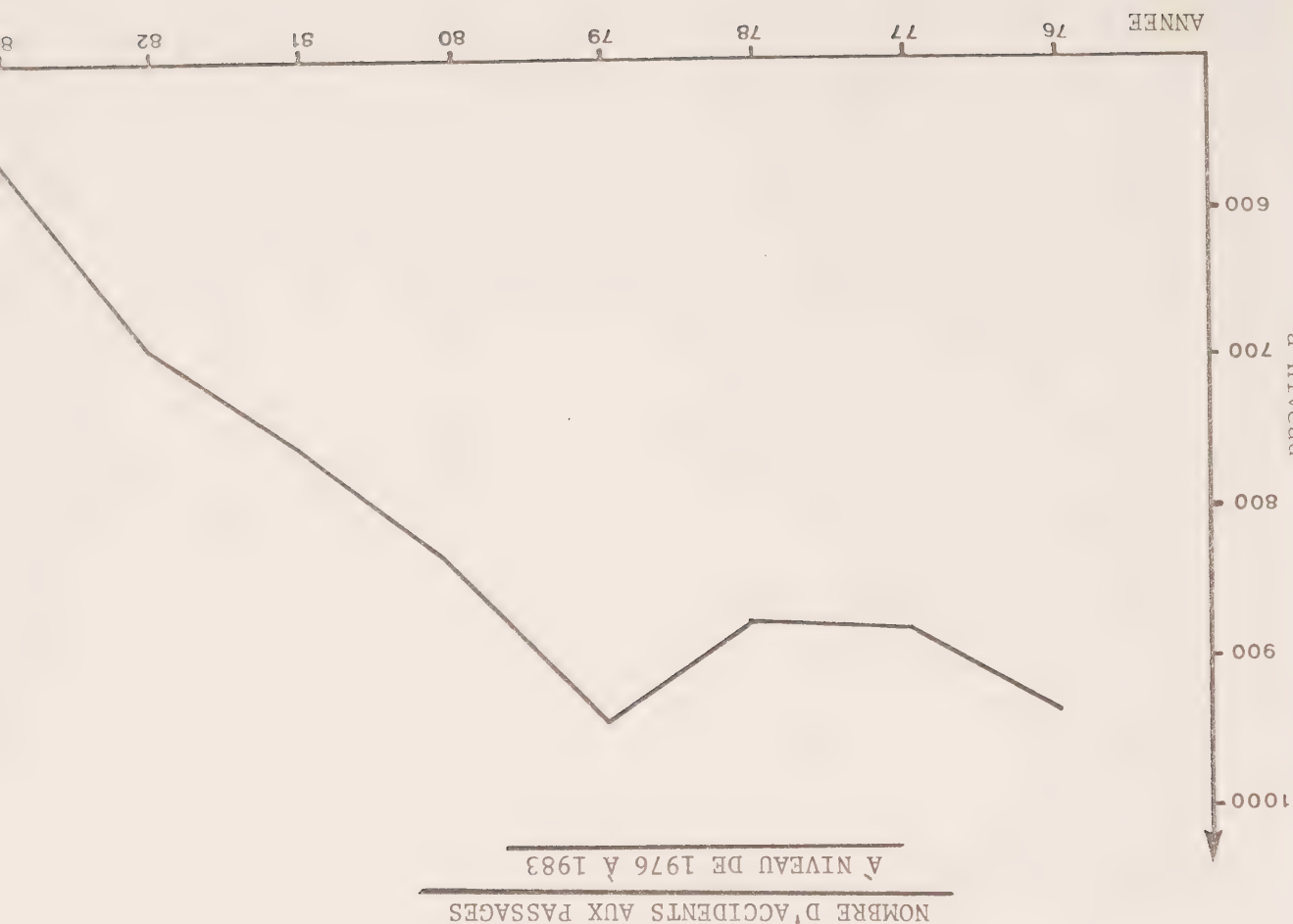
Accidents aux passages à niveau selon la saison

Jan.-mars, déc.

Avril-nov.

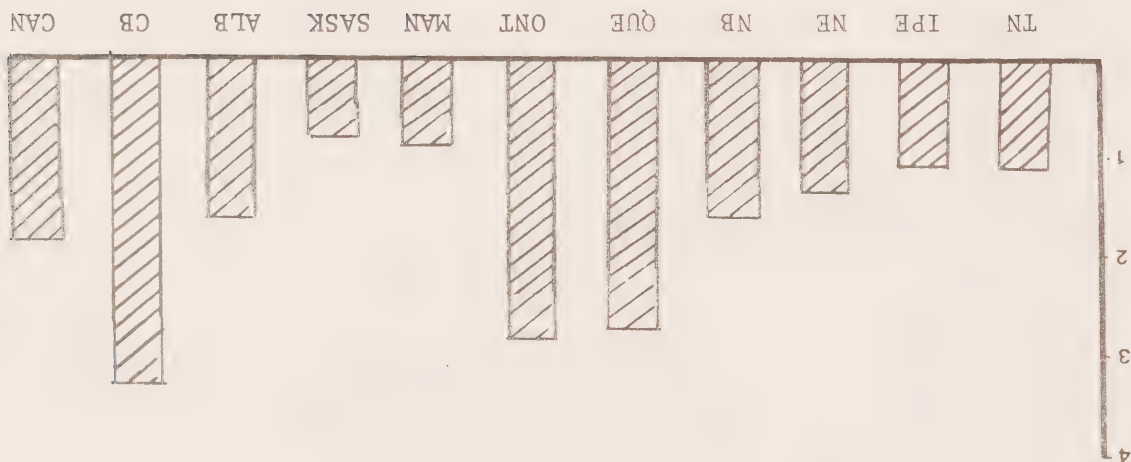
TOTAL	312	214	41	567	100
132	93	15	240	42	
180	121	26	327	58	

Nombre d'accidents aux passages à niveau



NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU DE 1976 À 1983

Nombre d'accidents aux passages à niveau par 100 passages à niveau



NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU PAR 100 PASSAGES À NIVEAU PAR PROVINCE EN 1983

86 % des accidents impliquaient des trains de marchandises et 11 % des trains de voyageurs. Dans les autres cas, il s'agissait de draïssines et des machines d'entretien de la voie.

Victimes

Ce sont les accidents ferroviaires survenant aux passages à niveau, qui sont à l'origine de la plupart des décès, mais il ne s'agit pas de passagers ou d'employés des compagnies ferroviaires. En effet, 93 % des victimes sont des occupants de véhicules à moteur, les autres étant des piétons. Au total, il y a eu 58 morts à des passages à niveau en 1983, soit 24,7 % de moins qu'en 1982.

Quatre-vingt-cinq pourcent du nombre total de blessés aux passages à niveau sont des occupants de véhicules à moteur. Dix pourcent des blessés étaient les employés des compagnies ferroviaires. En tout, il y a eu 286 blessés dans les accidents aux passages à niveau en 1983, c'est-à-dire 19,9 % de moins qu'en 1982.

PARTIE 4

ACCIDENTS AUX PASSAGES À NIVEAU

Accidents

Il y a accident à un passage à niveau lorsqu'il y a collision entre du matériel roulant acheminé sur la voie et un usager d'un passage à niveau public, privé ou de ferme, et que cette collision cause des dommages ou fait des victimes.

Au total, il y a eu 567 accidents aux passages à niveau en 1983, soit 17,8 % de moins qu'en 1982, une amélioration prononcée. Au cours de l'année le nombre de trains-milles ferroviaires réalisés a augmenté près de 4 %. La plupart des accidents de cette sorte, dont les 536 survenus en 1983, ont lieu à des passages à niveau publics. En 1983, on a enregistré une baisse de 17,5 % par rapport à l'année précédente. Le nombre d'accidents aux passages à niveau privés a diminué de 12,5 %. Seulement 43 % du nombre total d'accidents aux passages à niveau ont fait des victimes, soit 13,5 % de moins qu'en 1982, et les accidents qui n'ont fait aucune victime ont diminué de 21,0 %. Il y a eu 39 accidents aux passages à niveau par million de véhicules à moteur immatriculés en 1983, ce qui constitue une amélioration de 18,8 %. Le taux d'accidents aux passages à niveau par million de trains-milles est de 7,40 en 1983, comparativement à 9,35 en 1982.

Voici quelques caractéristiques d'importances en ce qui concerne les accidents aux passages à niveau:

- En 1983, presque 50 % des accidents aux passages à niveau ont lieu à des passages à niveau publics non protégés, 46 % à des passages à niveau publics protégés et le reste à des passages à niveau privés ou de ferme.
- En générale la majorité des accidents aux passages à niveau n'a fait aucune victime. En 1983 seulement 34 % ont provoqué des blessures, alors que 9 % ont fait des morts.
- 42 % de tous les accidents aux passages à niveau ont lieu pendant les mois d'hiver, soit janvier, février, mars et décembre.
- En nombres absolus, les deux tiers des accidents aux passages à niveau en 1983 ont eu lieu en Ontario, au Québec et en Alberta. Cependant, lesdites provinces comptent plus de la moitié du nombre total de passages à niveau au Canada.
- Fondé sur un échantillon de 94 % de tous les accidents aux passages à niveau deux tiers ont lieu pendant le jour, sans doute parce qu'il y a moins de trafic le soir.
- Presque deux tiers de tous les accidents aux passages à niveau dans l'échantillon un train frappe un véhicule.

ACCIDENTS AUX PASSAGES À NIVEAU

PARTIE 4

NOMBRE DE DÉRAILLEMENTS DE TRAINS DIRECTS PAR MILLIARD DE TONNES-MILLES BRUTES
(M.T.M.B.) (1976 à 1983)

	1976	1977	1978	1979	1980	1981	1982	1983
Nombre total de déraillements	206	190	188	239	209	236	196	170
déraillements de trains directs	200	180	181	232	186	204	176	138
déraillements de trains directs par M.T.M.B.	146.0	147.7	153.6	156.6	161.0	159.4	143.3	160.6
Nombre total de déraillements	104	105	86	92	72	95	111	64
déraillements de trains directs	99	99	84	90	70	82	89	55
déraillements de trains directs par M.T.M.B.	101.0	106.2	112.1	114.8	114.0	119.4	112.8	119.6
Nombre total de déraillements	14	17	21	8	11	17	20	21
déraillements de trains directs	13	16	20	6	9	11	8	8
déraillements de trains directs par M.T.M.B.	35.5	37.1	28.0	44.6	40.1	30.9	23.4	25.8*
Nombre total de déraillements	37	43	71	13	22	36	34	31*
déraillements de trains directs par M.T.M.B.	1.10	1.01	0.97	1.04	0.84	0.96	0.98	0.66*
Nombre total de déraillements	324	312	295	339	292	348	327	254
déraillements de trains directs	312	295	285	328	265	297	273	201
déraillements de trains directs par M.T.M.B.	282.6	291.0	293.8	316.1	316.1	309.7	279.6	306.0*
Toutes les compagnies ferroviaires								
Autres								
Proximité								

3.5 NOMBRE DE VICTIMES DES DÉRAILLEMENTS (1976 à 1983)

	1976	1977	1978	1979	1980	1981	1982	1983
Morts								
CN	-	1	2	-	-	-	-	-
CP	2	-	-	1	-	-	-	-
Autres	-	-	-	-	-	-	-	-
Toutes les compagnies ferroviaires	2	1	2	1	-	-	-	-
Blessés								
CN	127	37	25	40	77	83	46	31
CP	57	14	2	33	25	8	49	4
Autres	2	-	4	-	1	1	-	7
Toutes les compagnies ferroviaires	186	51	31	73	103	92	95	42

3.4 NOMBRE DE DÉRAILLEMENTS (1976-1983)

	1976	1977	1978	1979	1980	1981	1982	1983
CN								
Trains directs	200	180	181	232	186	204	176	138
Mouvements de								
triage	6	10	7	7	23	32	20	31
TOTAL	206	190	188	239	209	236	196	169
CP								
Trains directs	99	99	84	90	70	82	89	55
Mouvements de								
triage	5	6	2	2	2	13	22	9
TOTAL	104	105	86	92	72	95	111	64
Autres								
Trains directs	13	16	20	6	9	11	8	8
Mouvements de								
triage	1	1	1	2	2	6	12	13
TOTAL	14	17	21	8	11	17	20	21
Toutes les								
compagnies								
ferroviaires								
Trains directs	312	295	285	328	265	297	273	201
Mouvements de								
triage	12	17	10	11	27	51	54	53
TOTAL	324	312	295	339	292	348	327	254

3 NOMBRE DE DÉRAILLEMENTS PAR CAUSE (1982 et 1983)

CN	Trains directs		Mouvements de triage		Total	
	1982	1983	1982	1983	1982	1983
Mauvais état de la voie	79	59	8	11	87	70
Défectuosité de l'équipement	55	48	2	1	57	49
Erreur d'exploitation	42	31	10	19	52	50
Indéterminée	-	-	-	-	-	-
TOTAL	176	138	20	31	196	169
CP						
Mauvais état de la voie	33	26	4	2	37	28
Défectuosité de l'équipement	20	20	-	-	20	20
Erreur d'exploitation	34	9	18	7	52	16
Indéterminée	2	-	-	-	2	-
TOTAL	89	55	22	9	111	64
Autres						
Mauvais état de la voie	7	4	5	6	12	10
Défectuosité de l'équipement	-	4	1	1	1	5
Erreur d'exploitation	1	-	6	6	7	6
Indéterminée	-	-	-	-	-	-
TOTAL	8	8	12	13	20	21
Toutes les compagnies ferroviaires						
Mauvais état de la voie	119	89	17	19	136	108
Défectuosité de l'équipement	75	72	3	2	78	74
Erreur d'exploitation	77	40	34	32	111	72
Indéterminée	2	-	-	-	2	-
TOTAL	273	201	54	53	327	254
Indéterminée	-	-	-	-	-	-
Erreur d'exploitation	40	-48,1	32	-5,9	111	-35,1
Défectuosité de l'équipement	72	-4,0	2	-33,3	78	-5,1
la voie	89	-25,2	17	11,8	136	-20,6
Mauvais état de la voie	119	-25,2	17	11,8	136	-20,6
Défectuosité de l'équipement	75	-4,0	3	-33,3	78	-5,1
Erreur d'exploitation	77	-48,1	34	-5,9	111	-35,1
Indéterminée	2	-100,0	-	-	2	-100,0
TOTAL	273	-26,4	54	-1,9	327	-22,3
Variation en %						
Variation en %						
Variation en %						

3.2 NOMBRE DE VICTIMES DES DÉRAILLEMENTS (Relève pour 1982 et 1983)

MORTS		BLESSÉS			
Employés	Passagers	Total	CN	CP	Autres
1982	1983	1982	1983	1982	1983
Toutes les compagnies					
-	-	-	-	-	-
ferroviaires					
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
17	13	14	33	18	7
4	31	-	51	4	4
1	-	6	22	1	7
TOTAL					
51	44	20	95	42	42

DERAILLEMENTS

PARTIE 3

(Impliquant des trains en déplacement seulement)

3.1 NOMBRE DE DERAILLEMENTS (Relève pour 1982 et 1983)

Tous les déraillements
Déraillements avec des m.d.
1982 1983

CN		CP	
Trains directs	176	138	29
	20	31	15
	196	169	44
TOTAL			57

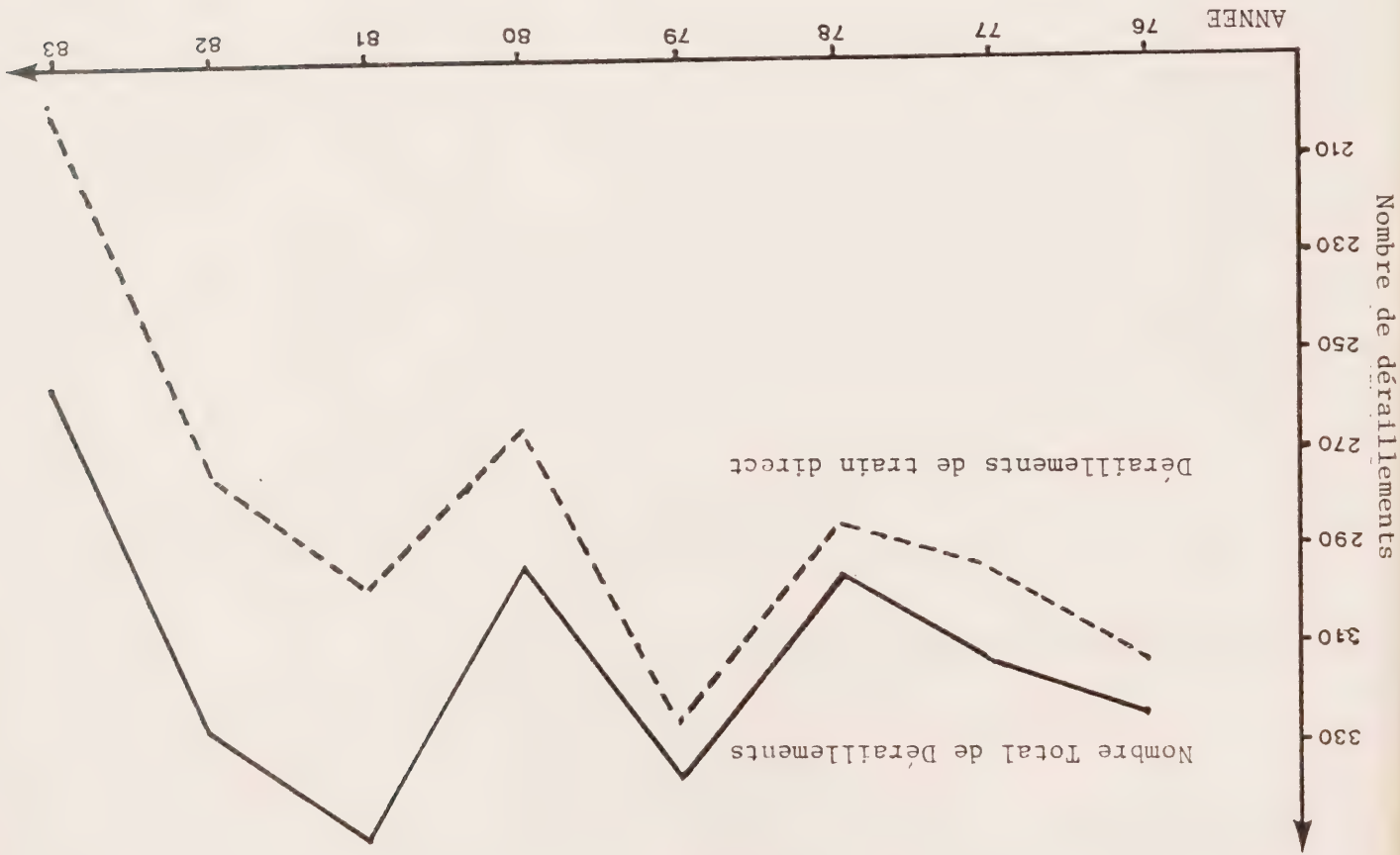
Trains directs	89	55	26
	22	9	20
	111	64	46
TOTAL			23

Trains directs	8	8	-
	12	13	11
	20	21	14
TOTAL			

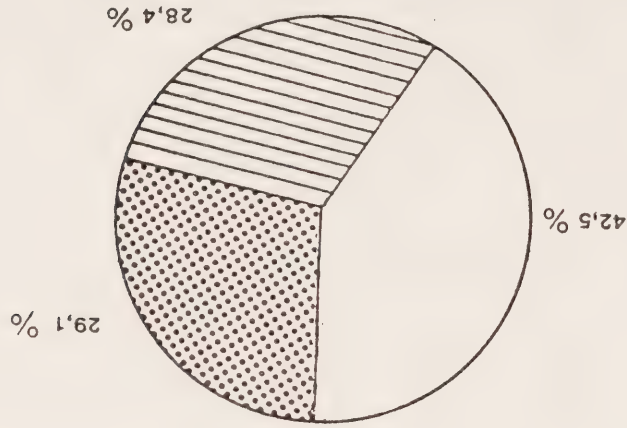
Toutes les compagnies ferroviaires		Variation en %	
Trains direct	273	201	-26,4
	54	53	-1,9
	327	254	-22,3
Mouvements de triage			
Trains directs	45	45	
	49	46	
	94	101	
TOTAL			

Variation en %	
Trains direct	-18,2
	6,5
	-6,9
Mouvements de triage	
Trains directs	
TOTAL	

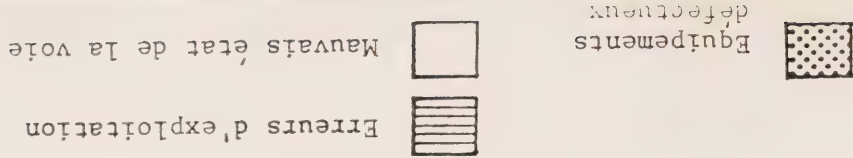
NOMBRE DE DÉRAILLEMENTS DE 1976 À 1983



NOMBRE DE DÉRAILLEMENTS PAR CAUSE EN 1983



Nombre Total de Déraillements: 254



PARTIE 3

DÉRAILLEMENTS

(Impliquant des trains en déplacement seulement)

Accidents

Le déraillement d'un train survient lorsqu'un train, une locomotive ou un wagon sort des rails. Les critères régissant la présentation des rapports sont les mêmes que pour les collisions. Cependant, contrairement aux collisions, la plupart des déraillements qui font l'objet de rapports ont lieu sur des voies principales plutôt que dans les gares de triage.

En 1983, il y a eu en tout 254 déraillements, soit 22,3 % de moins qu'en 1982. En fonction de tonnes-milles brutes le trafic ferroviaire s'est élevé d'environ 9 % pendant la même durée. Près de 80 % de ces déraillements, soit 26,4 % de moins que l'année précédente, ont eu lieu sur des voies principales. Le nombre de déraillements dans les gares de triage a diminué de 1,9 %. Des 254 déraillements mentionnés il y avait 201 sur les voies principales en 1983; 16 sont des trains de voyageurs. En 1982, ces données étaient de 273 et 13 respectivement. Plus du tiers de tous les déraillements en 1983 mettent en cause des wagons contenant des marchandises dangereuses et plus de la moitié de ces accidents ont eu lieu dans des gares de triage. Toutefois, le nombre de cas impliquant des marchandises dangereuses a diminué de 6,9 % par rapport à l'année précédente. Le nombre de déraillements sur des voies principales par milliard de tonnes-milles brutes étaient de 0,66 en 1983 comparativement à 0,98 en 1982.

En 1983, le mauvais état de la voie ou les conditions atmosphériques ont provoqué quatre dixièmes des déraillements. Le solde (60 %) des déraillements se partage également entre les déficiences de l'équipement et les activités d'exploitation. De plus pour l'année, il y a eu une amélioration dans toutes les catégories de déraillements.

Victimes

Règle générale, les déraillements ne font pas beaucoup de victimes. Au cours de la dernière année, le nombre de blessés a diminué de 55,8 %, c'est-à-dire qu'il a connu une baisse de 95 à 42.

DÉTAILLEMENTS

PARTIE 3

NOMBRE DE COLLISIONS DE TRAIN DIRECT PAR MILLION DE TRAINS-MILLES (MTM)
(1976-1983)

CN							
	1976	1977	1978	1979	1980	1981	1982
Autres	Nombre total de collisions	38	40	50	46	47	59
	Collisions de train direct*						
	MTM	51.7	50.7	50.3	41.4	37.9	30.6
	Collisions de train direct par MTM						
Toutes les compagnies ferroviaires	Nombre total de collisions	22	21	14	29	36	38
	Collisions de train direct*						
	MTM	28.7	29.2	29.9	27.6	27.2	24.4
	Collisions de train direct par MTM						
Toutes les compagnies ferroviaires	Nombre total de collisions	4	2	2	5	6	4
	Collisions de train direct*						
	MTM	10.0	10.3	9.5	22.6	24.4	18.9
	Collisions de train direct par MTM						
Toutes les compagnies ferroviaires	Nombre total de collisions	64	63	66	80	97	101
	Collisions de train direct*						
	MTM	90.5	90.3	89.7	91.6	89.2	73.9
	Collisions de train direct par MTM						
Les données pour des collisions entre les trains directs ne sont pas disponibles pour les années précédentes	Nombre total de collisions						
	Collisions de train direct*						
	MTM						
	Collisions de train direct par MTM						
Approximatif	Nombre total de collisions						
	Collisions de train direct*						
	MTM						
	Collisions de train direct par MTM						

2.3 NOMBRE DE COLLISIONS ET VICTIMES (1976-1983)

Nombre de collisions		1976	1977	1978	1979	1980	1981	1982	1983
Toutes les compagnies ferroviaires		64	63	66	80	97	108	101	92
Morts									
CN	38	40	50	46	47	69	59	61	
CP	22	21	14	29	44	36	38	27	
Autres	4	2	2	5	6	3	4	4	
Nombre de victimes									
Toutes les compagnies ferroviaires		1	1	-	3	1	3	-	7
Blessés									
CN	1	-	-	1	-	3	-	-	2
CP	-	1	-	2	1	-	-	-	5
Autres	-	-	-	-	-	-	-	-	-
Toutes les compagnies ferroviaires		1	1	-	3	1	3	-	7
Blessés									
CN	70	84	81	48	31	47	127	95	
CP	8	4	-	15	21	19	16	34	
Autres	5	-	2	9	9	1	4	34	
Toutes les compagnies ferroviaires		83	88	83	72	61	67	147	163

NOMBRE DE VICTIMES DES COLLISIONS (Relève pour 1982 et 1983)

	Total	Passagers	Employés
	1982 1983	1982 1983	1982 1983
MORTS			
CN	-	-	-
CP	-	-	-
Autres	-	-	-
Toutes les compagnies ferroviaires	-	-	-
BLESSES			
CN	28	99	39
CP	16	-	26
Autres	4	-	20
Toutes les compagnies ferroviaires	47	109	85
CN	127	56	28
CP	16	8	16
Autres	4	14	4
Toutes les compagnies ferroviaires	147	78	48
Morts et blessés	163	99	85

PARTIE 2

COLLISIONS

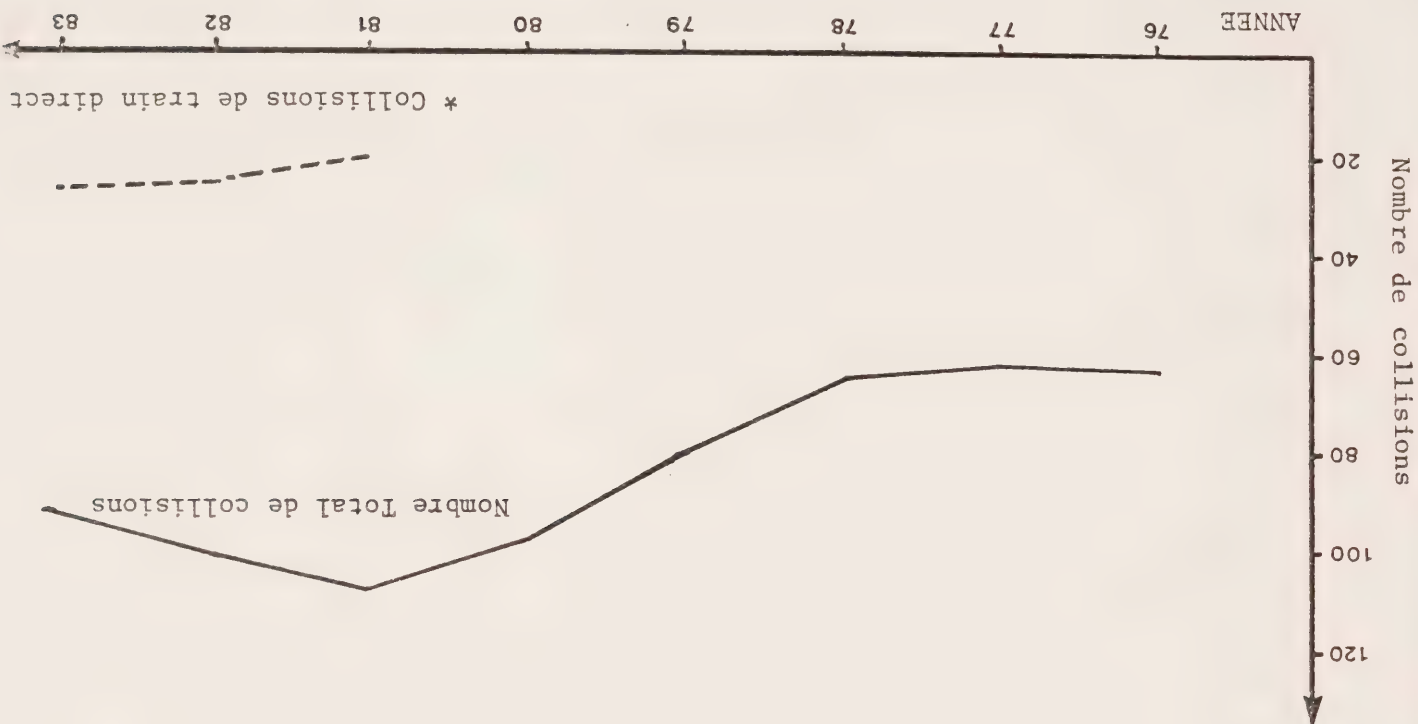
(Impliquant des trains en déplacement seulement)

2.1 NOMBRE DE COLLISIONS (Relève pour 1981 et 1982)

Toutes les collisions 1982 1983
Collisions avec des m.d. 1982 1983

CN		CP		Toutes les compagnies ferroviaires	
Tous les trains directs	15	18	6	9	12
	34	33	40	58	44
Mouvements de triage	44	43	34	58	44
TOTAL	59	61	40	101	92
Variation en %		Variation en %		Variation en %	
Tous les trains directs	9	9	3	9	12
	29	18	23	26	15
Mouvements de triage	2	2	1	2	1
TOTAL	4	4	1	4	1
Autres		Autres		Autres	
Tous les trains directs	2	2	-	2	1
Mouvements de triage	2	2	1	2	1
TOTAL	4	4	1	4	1

NOMBRE DE COLLISIONS DE 1976 À 1983



* Les données pour les collisions entre les trains directs ne sont pas disponibles pour les années précédentes.

PARTIE 2

COLLISIONS

(Impliquant des trains en déplacement seulement)

Accidents

Une collision de train survient lorsqu'un train, une locomotive ou un wagon qui se déplace entre en contact avec un autre train, une autre locomotive ou un autre wagon. Toute collision sur une voie principale entraînant des dommages matériels de plus de 750 \$ (ou sur toute autre voie si elle met en cause des marchandises dangereuses ou si elle fait des victimes) doit faire l'objet d'un rapport.

En 1983, il y a eu 92 collisions de train, soit 8,9 % de moins qu'en 1982. Plus de deux-tiers d'entre elles ont eu lieu dans les gares de triage, soit 16,0 % de moins que l'année précédente. Les collisions mettant en cause des trains directs ont augmenté de 11,5 % en 1983. Sur un total de 29, il n'y a eu que cinq collisions mettant en cause des trains de voyageurs alors qu'il y en avait eu deux en 1982. Plus de soixante pourcent des 92 collisions survenues en 1983 mettent en cause des wagons contenant des marchandises dangereuses, soit une diminution de 16,4 % par rapport à l'année précédente. La Près de 80 % de ces collisions ont eu lieu dans les gares de triage. La majorité de toutes collisions sont dues à l'erreur d'un employé, c'est-à-dire à une infraction aux règles et aux règlements d'exploitation. Les autres sont dues à des défauts mécaniques ou au vandalisme. Le nombre de collisions mettant en cause des trains directs par million de trains-milles s'élève à 0,38 en 1983, comparativement à 0,35 en 1982.

Victimes

Le nombre total de blessés en 1983 se trouvait à être 163, une augmentation de 16 de l'année précédente. Il y a eu 7 morts apparentés aux collisions en 1983, tandis que les collisions n'ont fait aucun mort en 1982. Cette augmentation s'explique par la collision survenue le 23 mars 1983 à une voie d'industrie à Wesssex, Alberta, lorsque un train de voyageurs de VIA a parcouru une aiguille, laissé ouvert par erreur, frappant quelques wagons stationnaires dans laquelle l'employé et 4 passagers sont morts.

COLLISIONS

PARTIE 2

1.4 NOMBRE DE VICTIMES PAR TYPE DE PERSONNES (1976-1983)

	1976	1977	1978	1979	1980	1981	1982	1983
Morts								
Passagers	1	-	-	-	-	1	1	4
Employés	8	7	9	10	10	13	17	16
Autres	173	134	143	141	179	140	128	105
TOTAL	182	141	152	151	189	154	146	125
Blessés								
Passagers	523	324	420	400	334	636	667	535
Employés	2,940	2,754	2,909	3,358	3,137	3,189	2,962	2,658
Autres	590	403	437	453	428	412	337	318
TOTAL	4,053	3,481	3,766	4,211	3,899	4,237	3,966	3,511

BLESSES		Accidents importants		Collisions		Déraillements		Accidents aux passages à niveau		Collisions/ Déraillement d'équipement de travail sur la voie		Accidents relatifs au service de train		Incidents divers		Incendies		Incidents des marchandises dangereuses		Tous les autres incidents		TOTAL																														
1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983																													
Employés	Passagers	Autres	Total	48	85	99	78	22	44	20	-	2	-	59	74	30	34	6	293	250	357	286	30	30	51	22	44	20	-	48	431	489	667	535	337	318	2,962	2,658	1,848	2,252	1	7	-	-	-	-	1	7	2,743	2,282	3,966	3,511

1.3 NOMBRE DE VICTIMES PAR SORTE D'ACCIDENT/D'INCIDENT (Relève pour 1982 et 1983)

MORTS		Accidents importants		Collisions		Déraillements		Accidents aux passages à niveau		Collisions/ Déraillements d'équipement de travail sur la voie		Accidents relatifs au service de train		Incidents divers		Incendies		Incident avec des marchandises dangereuses		Tous les autres incidents		TOTAL	
1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983
Employés	Passagers	Autres	Total	-	3	-	-	-	1	4	1	7	6	-	1	-	-	-	-	5	6	17	16
1982	1983	1982	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	4
1982	1983	1982	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	128	105
1982	1983	1982	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	146	125
1982	1983	1982	1983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	125	125

1.2 NOMBRE D'ACCIDENTS ET D'INCIDENTS (1976-1983)

	1976	1977	1978	1979	1980	1981	1982	1983
Accidents majeurs								
Collisions	64	63	66	80	97	108	101	92
Déraillements	324	312	295	339	292	348	327	254
Accidents aux passages à niveau	923	877	871	937	826	763	691	567
Collisions/								
Déraillements								
d'équipement								
de travail								
sur la voie	46	73	72	68	81	69	61	53
TOTAL	1,357	1,325	1,304	1,424	1,296	1,288	1,180	966
Accidents relatifs au service de train	S/O	S/O	S/O	S/O	S/O	729	614	703
Incidents divers								
Incendies	502	450	240	246	229	221	273	254
M.D. (fuites, etc.)	31	30	47	51	107	157	105	288
Tous autres incidents	S/O	S/O	S/O	S/O	S/O	2,886	2,811	2,383
TOTAL						3,264	3,189	2,925
Partie des accidents majeurs de train impliquant des marchandises dangereuses								
Collisions	7	7	14	17	44	65	67	56
Déraillements	33	36	43	42	65	132	101	94
Accidents aux passages à niveau	3	1	-	2	11	3	8	9

* Comme les statistiques figurant dans le rapport de 1982 ne sont pas ventilées de la même façon que par les années passées, il est impossible de donner ici une série chronologique complète. Dans les rapports précédents, la plupart des données sur les victimes d'accidents relatifs au service de train figuraient sous la rubrique "blessures corporelles diverses".

PARTIE 1

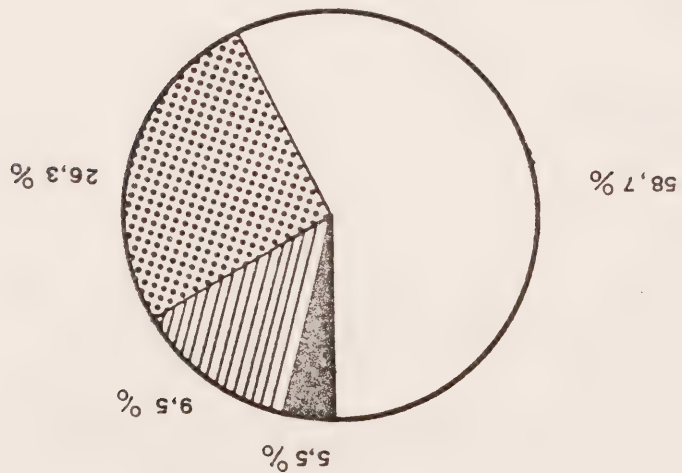
RELEVÉ DES ACCIDENTS ET DES INCIDENTS DE TRAINS

1.1 NOMBRE D'ACCIDENTS ET D'INCIDENTS (1982 et 1983)

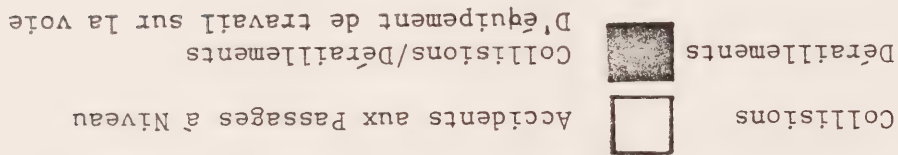
Accidents/Incidents			Variation en %	
			1982	1983
<u>Accidents majeurs</u>				
<u>Collisions</u>				
Collisions	101	92	-8,9	
Déraillements	327	254	-22,3	
Accidents aux passages à niveau	691	567	-18,0	
Collisions/Déraillements d'équipement	61	53	-13,1	
<u>de travail sur la voie</u>				
TOTAL	1,180	966	-18,1	
<u>Accidents relatifs au service de train</u>				
Employés frappés par du matériel roulant	29*	35	20,7	
Intrus frappés par du matériel roulant	91	111	22,0	
Employés descendant de matériel roulant ou y montant	494	557	12,8	
TOTAL	614	703	14,5	
<u>Incidents divers</u>				
Incendies	273	254	-7,0	
Incidents des marchandises dangereuses	105	288	174,3	
Tous les autres incidents	2,811	2,383	-15,2	
TOTAL	3,189	2,925	-8,3	

* Y compris un passager frappé par du matériel roulant.

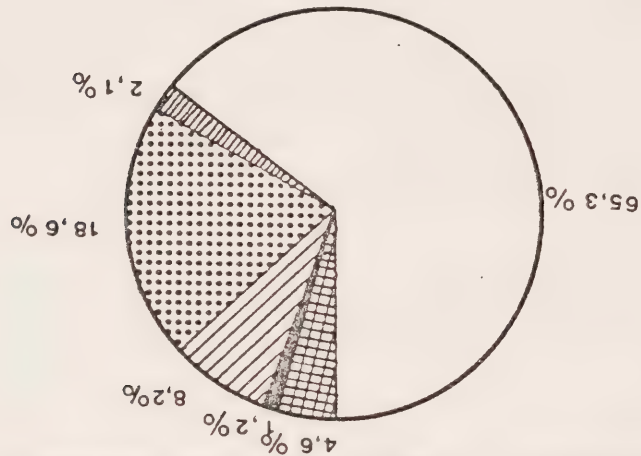
ACCIDENTS MAJEURS 1983



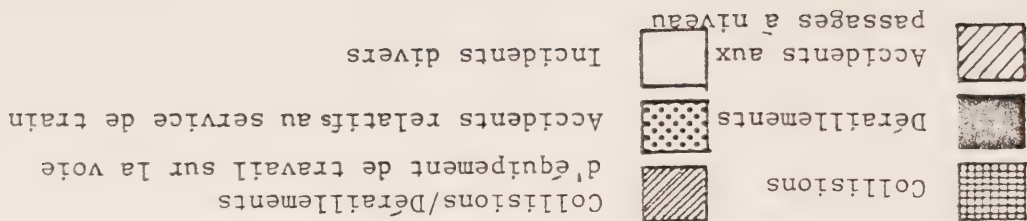
NOMBRE TOTAL D'ACCIDENTS : 966



NOMBRE DE BLESSÉS PAR SORTIE D'ACCIDENT ET D'INCIDENT 1983



NOMBRE TOTAL DE BLESSÉS : 3 511



occupants de véhicules à moteur. Quatre dixièmes des décès sont survenus lors d'accidents relatifs au service de train, les victimes étant dans la plupart des cas des intrus ou des suicidés.

Le nombre de blessés a diminué de 11,5 % en 1983. Les incidents divers sont la cause de deux tiers des 3511 cas de blessures (passagers, employés ou autres). Les accidents relatifs au service de train et ceux survenus aux passages à niveau sont à l'origine de 19 et de 8 % du nombre total de blessures respectivement.

Les trois quarts de tous les blessés en 1983 étaient des employés, 15,2 % des passagers et les autres, des occupants de véhicules à moteur surtout.

RELEVÉ DES ACCIDENTS ET DES INCIDENTS DE TRAINS

PARTIE I

- 3 -

Accidents et incidents

Pour les besoins du présent rapport, les accidents et les incidents ferroviaires sont classés en trois grandes catégories: les accidents majeurs, les accidents relatifs au service de train et les incidents divers. Il y a eu une amélioration prononcée dans le nombre absolu d'accidents majeurs par rapport à l'année précédente, ceux-ci ont diminué de 18,1 %. Cependant en 1983, les accidents relatifs au service de train ont augmenté de 14,5 %, tandis que les incidents divers ont diminué de 8,3 %. Au cours de l'année, le tonnage du trafic de transport de marchandises ferroviaires a augmenté de 3,8 %.

Les accidents aux passages à niveau comptent pour environ six dixièmes des 966 accidents importants survenus en 1983, ce qui constitue une diminution de 18,0 % par rapport à 1982. Les déraillements de trains représentent 26 % des accidents majeurs et ils ont diminué de 22,3 % par rapport à 1982. Le reste des accidents majeurs, soit 15 %, consistent en des collisions de trains et des collisions/déraillements impliquant d'équipement de travail sur la voie tel que les draines. Ces catégories ont connu des baisses de 8,9 et de 13,1 % respectivement.

Les données actuelles sur les accidents majeurs démontrent également qu'environ soixante pourcent du nombre total de collisions de train pouvant faire l'objet d'un rapport mettent en cause des wagons contenant des marchandises dangereuses; cependant, près de 80 % de ces collisions ont eu lieu dans les gares de triage, au cours de l'aiguillage. Plus du tiers de tous les déraillements de train mettent en cause des marchandises dangereuses et plus de la moitié de ces déraillements sont survenus dans les gares de triage ou sur les embranchements.

En 1983, il y a eu 703 accidents relatifs au service de train. On compte quelques cas d'employés ou d'intrus frappés par du matériel roulant, mais la plupart des accidents touchaient des employés qui se sont blessés en montant sur du matériel roulant ou en descendant.

Au nombre de 2925 en 1983, les incidents divers varient considérablement, depuis les incendies et les fuites de marchandises dangereuses (non reliés aux accidents ferroviaires) jusqu'aux blessures subies par des passagers et des employés des compagnies ferroviaires. Ces blessures représentent plus de trois quart de tous les incidents divers.

Victimes

En 1983, 125 personnes ont perdu la vie lors d'accidents ferroviaires, soit 14,4 % de moins qu'en 1982. Un peu moins de la moitié de ces accidents mortels se sont produits aux passages à niveau. Habituellement, les victimes ne sont pas des employés ni des passagers, mais plutôt des

RELEVÉ DES ACCIDENTS ET DES INCIDENTS DE TRAINS

PARTIE I

INTRODUCTION

- 1 -

Un accident ferroviaire est un événement imprévu qui met en cause des trains, des locomotives, des wagons ou d'équipement de travail sur la voie, entraîne des dommages à la propriété, fait des victimes ou met en cause des marchandises dangereuses, tant sur les voies principales que dans les gares de triage. Dans le présent rapport, les accidents majeurs comprennent les collisions, les déraillements, les accidents aux passages à niveau y inclus ceux qui impliquent des draines ou des machines d'entretien de la voie. En général, les collisions et les déraillements sont les accidents qui provoquent le plus de dommages matériels alors que les accidents aux passages à niveau sont ceux qui font le plus de victimes. Les accidents secondaires sont relatifs au service de train; ils surviennent lorsque des employés ou d'autres personnes sont frappés par du matériel roulant ou lorsque certains employés se blessent en montant dans un train ou en descendant. Conformément aux lois fédérales, les compagnies ferroviaires doivent aviser la Commission canadienne des transports de la plupart de ces accidents. Certaines sortes d'incidents peuvent également faire l'objet de rapports. Il s'agit des incendies, des fuites de marchandises dangereuses, des obstacles sur la voie principale et des blessures diverses subies par des passagers ou des employés des compagnies ferroviaires.

Le relevé de 1982 a quitté le format des années précédentes et dorénavant il a pour but d'expliquer toutes informations présentes dans le relevé. En 1983 ce relevé prend le même modèle: il renferme surtout les données pour 1983, qu'il compare avec les données connexes de 1982. Chaque partie traite d'une catégorie d'accidents particulière, ainsi que des accidents/incidents et victimes associés à cette catégorie pour les deux dernières années. Les données pour les années 1976 à 1980 sont tirées pour la plupart des relevés précédents et elles ne figurent ici qu'à titre de référence seulement, car elles ne peuvent pas être comparées avec précision aux données actuelles.

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DIRECTION DE L'EXPLOITATION
COMITE DES TRANSPORTS PAR CHEMIN DE FER
OTTAWA, CANADA
1984

RELEVÉ DES
ACCIDENTS/INCIDENTS FERROVIAIRES
RAPPORTÉS À LA
COMMISSION CANADIENNE DES TRANSPORTS
EN 1983



DIRECTION DE L'EXPLOITATION
COMITE DES TRANSPORTS PAR CHEMIN DE FER
OTTAWA, CANADA
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RELEVÉ DES
ACCIDENTS/INCIDENTS FERROVIAIRES
RAPPORTÉS À LA
COMMISSION CANADIENNE DES TRANSPORTS
EN 1983





Commission canadienne
des transports

Canadian Transport
Commission

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1984
SUMMARY OF
RAILWAY ACCIDENTS/INCIDENTS
AS REPORTED TO THE
CANADIAN TRANSPORT COMMISSION

OPERATIONS BRANCH
RAILWAY TRANSPORT COMMITTEE
OTTAWA, CANADA
1985



Commission canadienne
des transports

Canadian Transport
Commission

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INTRODUCTION

Railway accidents and incidents are unexpected occurrences involving trains, engines, cars or on-track equipment, that affect or could affect the safety of rail operations. Railroads under federal jurisdiction are required to advise the Canadian Transport Commission on railway occurrences if they result in property damage or casualty or involve the handling of dangerous goods. For the purposes of this report, railway occurrences have been classified into three broad categories: Train Accidents, Train Service Accidents and Incidents. Train Accidents include collisions, derailments and highway/railway crossing accidents; as a rule collisions and derailments are more costly in terms of physical damage while crossing accidents cause more casualties. Train Service Accidents include cases where employees or trespassers are struck by rolling stock or where personnel are injured in the process of entraining and detraining. Incidents include fires, dangerous commodity leakages, obstruction to main track and miscellaneous personal injuries sustained by railway passengers and employees.

Beginning with the 1982 version of the Accidents/Incidents Summary, the format of the publication changed in that an attempt was made to provide the reader with a fuller interpretation of the information being presented. The subsequent summaries have followed a similar format: the primary emphasis being on data for the current year and how it compares with comparable figures for the previous year. Each section examines a particular accident category, the associated accidents/incidents and related casualties.

SECTION 1 Summary of Railway Occurrences

SECTION 1

SUMMARY OF RAILWAY OCCURRENCES

For purposes of this report, the following definitions have relevance:

Railway Occurrence

A generic expression that includes Train Accidents, Train Service Accidents and Incidents which were reported to the Commission pursuant to the requirements of S. 225 of the Railway Act, General Order 0-1 and related orders and regulations of the CTC.

Train Accident

An occurrence associated with the operation of a train, engine, car, track motor car (TMC) or other maintenance of way equipment (MWE) involving property damage in excess of \$750 for main line operations, and casualties or dangerous commodities in respect of both main line and yard operations, in which: -

- a) unit(s) of rolling stock derail (derailment)
- b) unit(s) of railway rolling stock collide with other unit(s) of railway rolling stock (collision) or with vehicular traffic at level crossings at grade (crossing accident).

Train Service Accident

An occurrence associated with the operation of a train, engine, car, track motor car (TMC) or other maintenance of way equipment (MWE), in which:-

- a) an employee of the railway company is injured as a result of being struck by railway rolling stock or while in the process of entraining and detraining said rolling stock;
- b) a trespasser or passenger is injured as a result of being struck by railway rolling stock or while in the process of entraining or detraining said rolling stock.

Incident

An occurrence, other than an accident, associated with the operation of a train:-

- a) which affects or could affect the safety of operation
- b) whereby railway employees sustain personal injuries resulting from the performance of their duties (other than by a Train Accident or Train Service Accident)
- c) whereby railway passengers sustain personal injuries (other than by a Train Accident or Train Service Accident).

Accidents/Incidents

With the exception of the year 1979, the total number of Train Accidents declined steadily over the past decade culminating in a record low in 1983. In 1984, these accidents numbered 1,018, a 5.4% increase over 1983. However, the ratio of accidents to work performed actually decreased last year as traffic in terms of total carload tonnage handled rose by 16.1% in 1984. Further analysis shows that rail traffic was at a recessionary period low in 1982 and at its peak in 1984; yet the total for this category of accidents in 1984 was 13.6% lower than in 1982 (Fig 1.1). Train Service Accidents showed a decline of 18.6% in 1984 as against 1983, while Incidents were up by 9.7%.

Almost 60% of the above 1,018 Train Accidents in 1984 were those at highway/railway crossings (Fig 1.2) and these increased by 4.9% over the year. Train derailments, which accounted for a further 27% rose by 9.8% in 1984. However, crossing accidents and train derailments which are the most serious in terms of loss of life and financial costs respectively were well below their 1982 levels. Derailments and collisions that occur during yard operations are normally only reportable if they involve dangerous commodities or result in a casualty. Fig. 1.3 illustrates that although through trains account for the majority of train derailments, the reverse is the case for train collisions. Train collisions accounted for 10% of all Train Accidents and although these increased by 7.6% over the year, this was due to the large number of minor collisions that occur in yards during switching operations. The remaining accidents in the Train Accident category are collisions/derailments involving on-track equipment such as track motor cars; these declined by 15.1% in 1984.

Current data for Train Accidents also shows that two-thirds of the total number of reportable train collisions involved cars carrying dangerous commodities (D.C.); however, 94% of these D.C. related collisions occurred in yards during switching operations. Over one-third of all train derailments were D.C. related and of these cases 41% occurred in yards or sidings. The risk of D.C. involvement in a crossing accident is considerably less; in 1984, less than 2% of all crossing accidents were D.C. related.

There were 572 Train Service Accidents in 1984. Although these include employees and trespassers being struck by rolling stock, the majority of these accidents involved employees injured while getting off/on rolling stock.

Incidents numbered 3,210 in 1984 and these cover a wide variety of occurrences ranging from fires and D.C. leakages (not related to train accidents), to personal injuries incurred by railway employees and passengers. These personal injuries accounted for just over three-fourths of all Incidents.

Casualties

There were 123 railway related fatalities in 1984, which is almost identical to the total of 125 in 1983. A little more than half of these fatalities occurred at railway crossings. Although crossing accidents are the single most important cause of railway fatalities (Fig. 1.4), the persons killed are not as a rule railway employees or passengers. Almost all fatalities at

railway crossings are motor vehicle occupants. Train Service Accidents accounted for another 41% of railway fatalities, the casualties being mainly trespassers and suicides.

Total injuries declined by 1.0% in 1984. Incidents accounted for nearly three-fourths of the 3,476 injuries to passengers, employees and others in 1984 (Fig. 1.5). As mentioned in Section 7, there is no minimum severity for the reporting of these miscellaneous incident injuries: they range from a loss of limb to a minor slip or fall. Train Service Accidents and accidents at railway crossings respectively accounted for a further 15% and 8% of total injuries.

Just over three-fourths of all injuries in 1984 were to employees; passengers accounted for another 12.4%. The remaining injuries were mostly incurred by the occupants of motor vehicles.

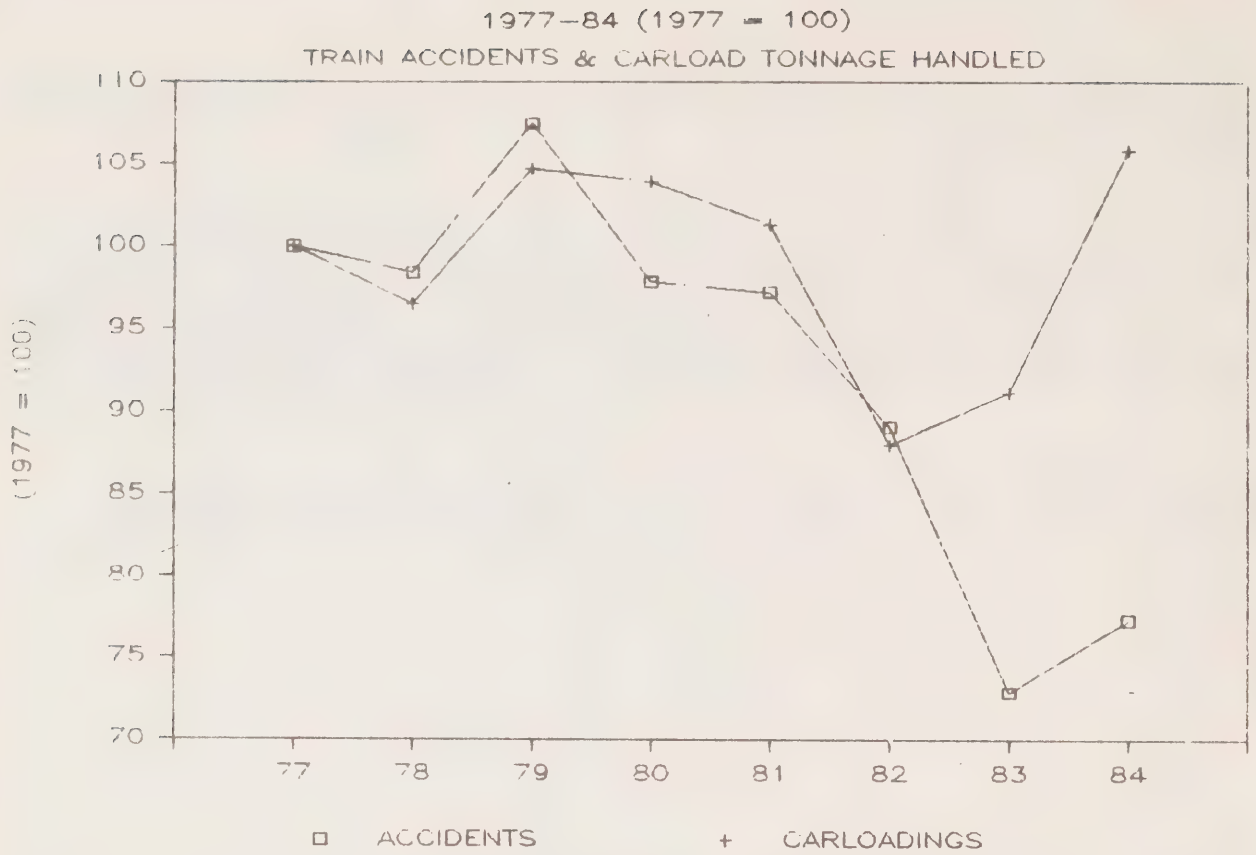
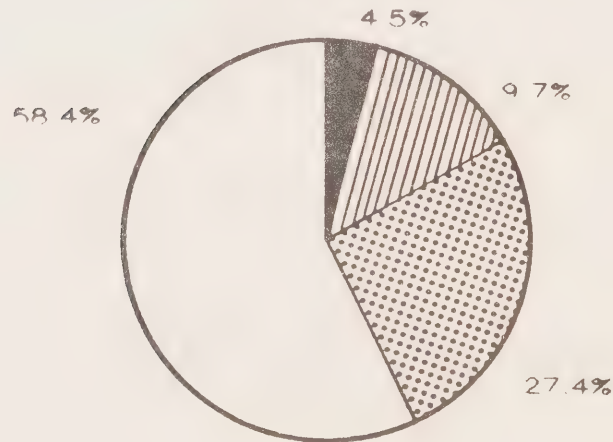


Fig. 1.1

1984
TRAIN ACCIDENTS BY TYPE



Total Number of Accidents : 1,018

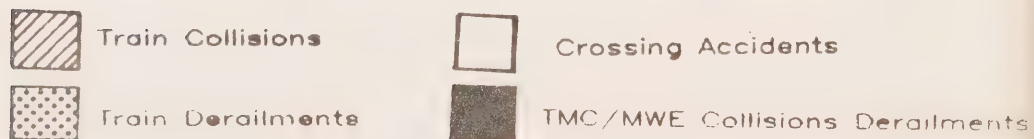


Fig. 1.2

1982 - 84

TRAIN DERAILMENTS & COLLISIONS

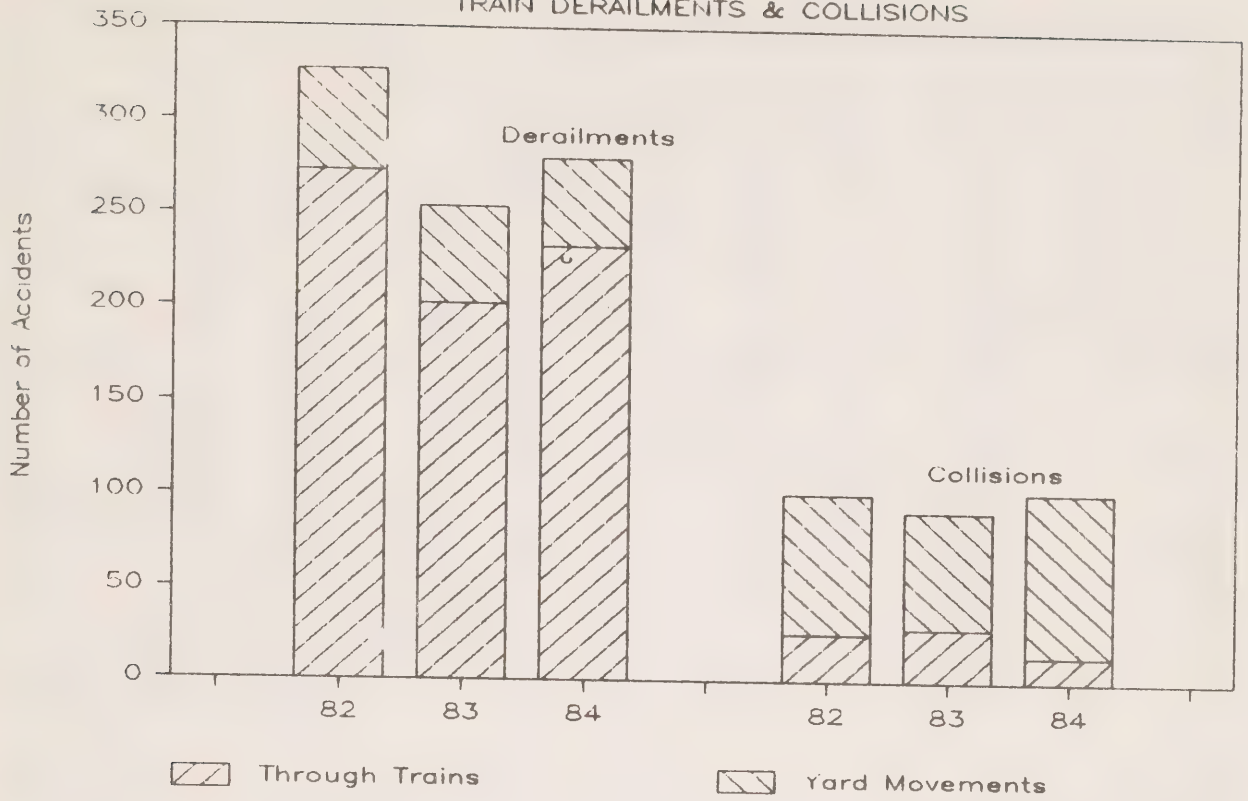


Fig. 1.3

1977-84

FATALITIES BY TYPE OF ACCIDENT/INCIDENT

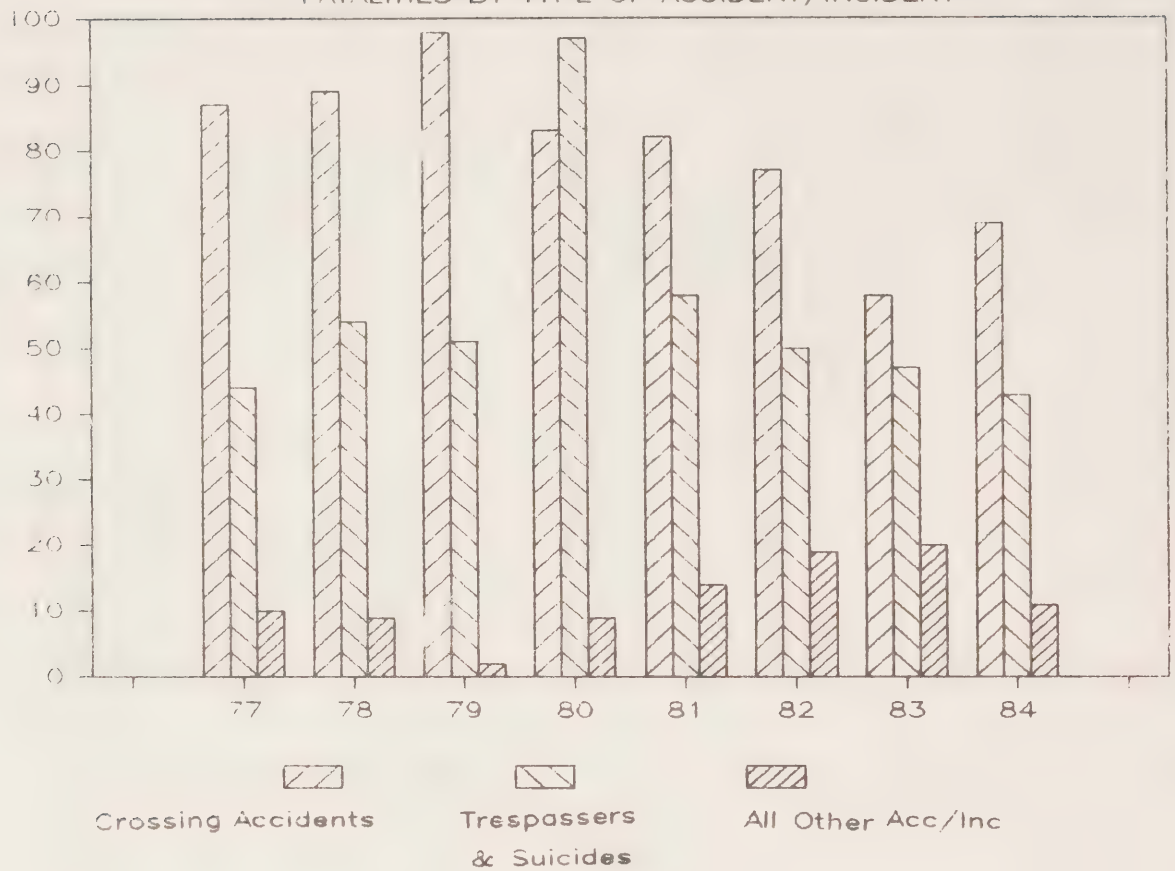


Fig. 1.4

1984

INJURIES BY TYPE OF ACCIDENT/INCIDENT

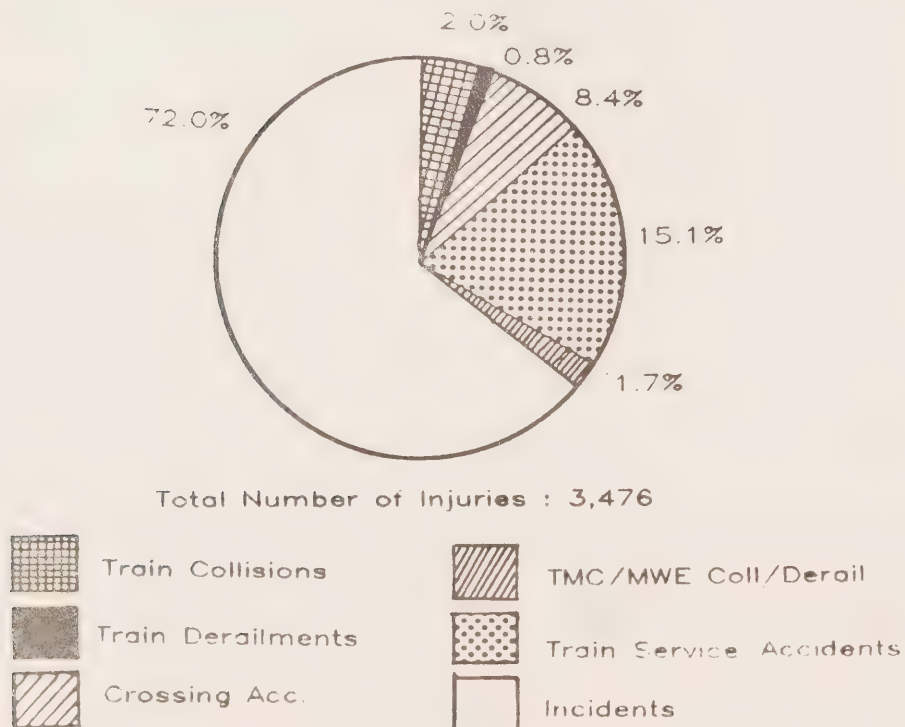


Fig. 1.5

SECTION 1

SUMMARY OF RAILWAY OCCURRENCES

1.1 NUMBER OF ACCIDENTS AND INCIDENTS (1983 and 1984)

	<u>Accidents/Incidents</u>		
	<u>1983</u>	<u>1984</u>	<u>% Change</u>
<u>Train Accidents</u>			
Train Collisions	92	99	7.6
Train Derailments	254	279	9.8
Crossing Accidents	567	595	4.9
TMC/MWE Collisions/Derailments*	<u>53</u>	<u>45</u>	<u>-15.1</u>
TOTAL	966	1,018	5.4
<u>Train Service Accidents</u>			
Employees Struck by Rolling Stock	35	38	8.6
Trespassers Struck by Rolling Stock	111	101	-9.0
Employees Getting Off/On Rolling Stock	<u>557</u>	<u>433</u>	<u>-22.3</u>
TOTAL	703	572	-18.6
<u>Incidents</u>			
Fires	254	231	-9.1
Dangerous Commodities Incidents	288	419**	45.5**
All Other Incidents	<u>2,383</u>	<u>2,560</u>	<u>7.4</u>
TOTAL	2,925	3,210	9.7

*TMC: Track Motor Car; MWE: Maintenance of Way Equipment

** This increase is mainly due to more stringent reporting requirements.

1.2 NUMBER OF ACCIDENTS AND INCIDENTS (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Train Accidents</u>								
Train Collisions	63	66	80	97	108	101	92	99
Train Derailments	312	295	339	292	348	327	254	279
Crossing Accidents	877	871	937	826	763	691	567	595
TMC/MWE Collisions/ Derailments*	<u>73</u>	<u>72</u>	<u>68</u>	<u>81</u>	<u>69</u>	<u>61</u>	<u>53</u>	<u>45</u>
TOTAL	1,325	1,304	1,424	1,296	1,288	1,180	966	1,018
<u>Train Service Accidents**</u>	N/A	N/A	N/A	N/A	729	614	703	572
<u>Incidents</u>								
Fires	450	240	246	229	221	273	254	231
D.C. (leakages, etc.)	30	47	51	107	157	105	288	419
All Other Incidents**	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,560</u>
TOTAL					3,264	3,189	2,925	3,210
<u>D.C. Related Portion of Train Accidents</u>								
Train Collisions	7	14	17	44	65	67	56	65
Train Derailments	36	43	42	65	132	101	94	100
Crossing Accidents	1	-	2	11	4	8	9	11

*TMC: Track Motor Car; MWE: Maintenance of Way Equipment

** Beginning with the 1982 Report, the statistical presentation of accident statistics changed. A complete time series is not possible as in earlier years a large portion of the injuries sustained in the above Train Service Accidents were included under Miscellaneous Personal Injuries.

1.3 CASUALTIES BY ACCIDENT/INCIDENT (1983 and 1984 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Other</u>		<u>Total</u>	
	1983	1984	1983	1984	1983	1984	1983	1984
<u>FATALITIES</u>								
<u>Train Accidents</u>								
Train Collisions	3	-	4	-	-	-	7	-
Train Derailments	-	1	-	-	-	-	-	1
Crossing Accidents	-	1	-	-	58	68	58	69
TMC/MWE Collisions/ Derailments*	1	-	-	-	-	-	1	-
<u>Train Service Accidents</u>	6	7	-	-	47	44	53	51
<u>Incidents</u>								
Fires	-	-	-	-	-	-	-	-
D.C. Incidents	-	-	-	-	-	-	-	-
All Other Incidents	6	2	-	-	-	-	6	2
TOTAL	16	11	4	-	105	112	125	123
<u>INJURIES</u>								
<u>Train Accidents</u>								
Train Collisions	85	46	78	25	-	-	163	71
Train Derailments	22	27	20	-	-	-	42	27
Crossing Accidents	30	18	5	9	251	265	286	292
TMC/MWE Collisions/ Derailments*	74	57	-	-	-	-	74	57
<u>Train Service Accidents</u>	587	464	-	-	65	61	652	525
<u>Incidents</u>								
Fires	5	3	-	-	-	1	5	4
D.C. Incidents	7	5	-	-	-	-	7	5
All Other Incidents	1,848	2,096	431	397	3	2	2,282	2,995
TOTAL	2,658	2,716	534	431	319	329	3,511	3,476

*TMC: Track Motor Car; MWE: Maintenance of Way Equipment

1.4 CASUALTIES BY TYPE OF PERSON (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Fatalities</u>								
Passengers	-	-	-	-	1	1	4	-
Employees	7	9	10	10	13	17	16	11
Other	<u>134</u>	<u>143</u>	<u>141</u>	<u>179</u>	<u>140</u>	<u>128</u>	<u>105</u>	<u>112</u>
TOTAL	141	152	151	189	154	146	125	123
<u>Injuries</u>								
Passengers	324	420	400	334	636	667	534	431
Employees	2,754	2,909	3,358	3,137	3,189	2,962	2,658	2,716
Other	<u>403</u>	<u>437</u>	<u>453</u>	<u>428</u>	<u>412</u>	<u>337</u>	<u>319</u>	<u>329</u>
TOTAL	3,481	3,766	4,211	3,899	4,237	3,966	3,511	3,476

SECTION 2 Collisions

SECTION 2

COLLISIONS

(Involving Train Movements Only)

Accidents

A train collision is an accident where a moving train, engine or car comes in contact with another train, engine or car. Collisions on main track with railway property damage above \$750 (or on any track if involving dangerous goods traffic or casualty) are reportable.

There were 99 train collisions in 1984: an increase of 7.6% over 1983. Yard movements accounted for 86% of this total and these were up by some 35% in 1984. Collisions involving through trains, however, dropped by nearly one-half (Fig. 2.1); of the 14 through train collisions, only one involved a passenger train as compared to five in 1983. Two-thirds of all train collisions in 1984 involved cars carrying dangerous commodities (D.C.), a 16.1% increase from 1983. Some 94% of the D.C. related collisions occurred in yards during switching operations. Of the 99 collisions in 1984, 39 resulted in a derailment; in 1983 the figures were 92 and 44 respectively. The majority of all collisions are due to employee failure --violation of operating rules and regulations. The rest relate to mechanical failure or vandalism. The number of through train collisions per million train-miles was 0.17 in 1984 as compared to 0.38 in 1983.

Casualties

Total injuries numbered 71 in 1984, which is 56% lower than the total in 1983. Twenty-eight of the above injuries occurred as a result of the earlier mentioned passenger train collision when on June 6, 1984 a VIA passenger train went through an improperly lined switch and collided with stationary flat cars at a lumber yard in Nepean, Ontario. Since 1977 there have been only 15 fatalities as a result of train collisions, 7 of which were in 1983; in 1984 train collisions did not result in any fatalities.

1977 - 84
TRAIN COLLISIONS

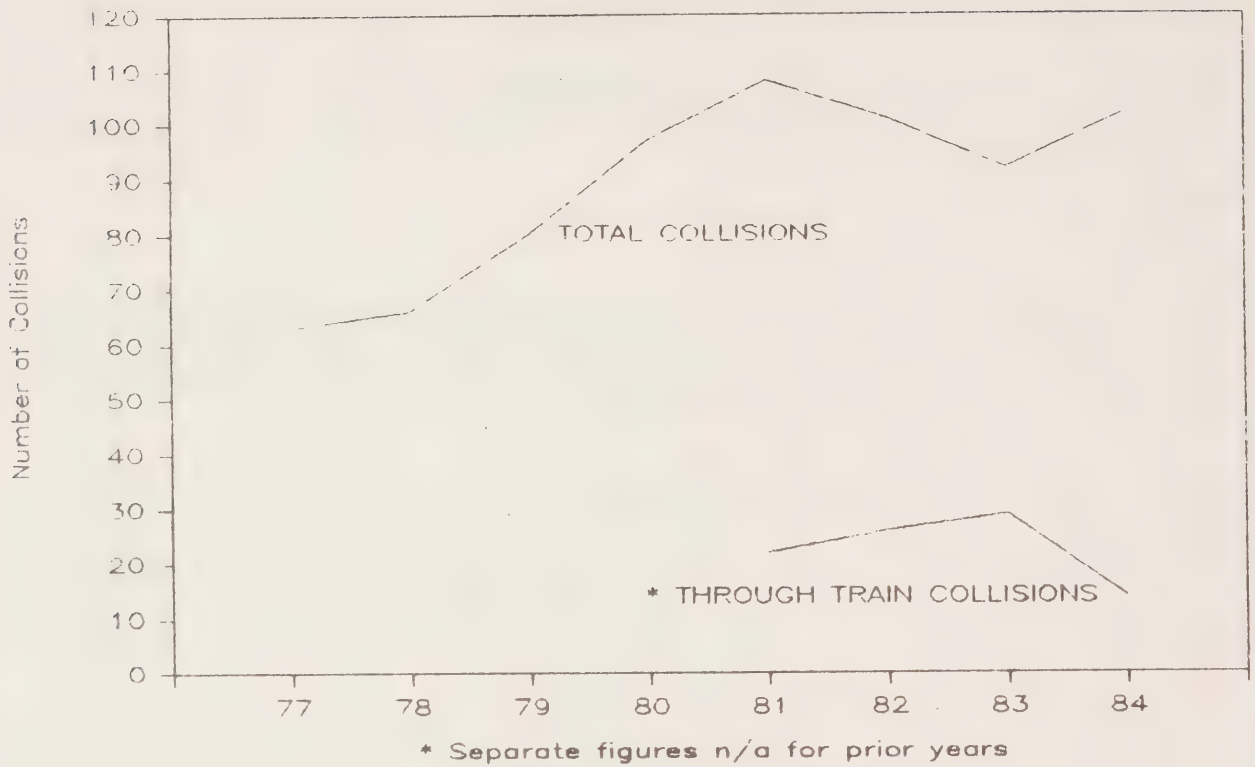


Fig. 2.1

SECTION 2

COLLISIONS

(Involving Train Movements Only)

2.1 NUMBER OF COLLISIONS (1983 and 1984 Summary)

	<u>All Collisions</u>		<u>D.C. Related Collisions</u>	
	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>
<u>CN</u>				
Through Trains	18	11	7	4
Yard Movements	<u>43</u>	<u>64</u>	<u>33</u>	<u>48</u>
TOTAL	61	75	40	52
 <u>CP</u>				
Through Trains	9	3	5	-
Yard Movements	<u>18</u>	<u>20</u>	<u>10</u>	<u>12</u>
TOTAL	27	23	15	12
 <u>Other</u>				
Through Trains	2	0	-	-
Yard Movements	<u>2</u>	<u>1</u>	<u>1</u>	<u>1</u>
TOTAL	4	1	1	1

	<u>% Change</u>			<u>% Change</u>		
<u>All Railways</u>						
Through Trains	29	14	-51.7	12	4	-66.7
Yard Movements	<u>63</u>	<u>85</u>	<u>34.9</u>	<u>44</u>	<u>61</u>	<u>38.6</u>
TOTAL	92	99	7.6	56	65	16.1

2.2 COLLISION CASUALTIES (1983 and 1984 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Total</u>	
	1983	1984	1983	1984	1983	1984
<u>FATALITIES</u>						
CN	2	-	-	-	2	-
CP	1	-	4	-	5	-
Other	-	-	-	-	-	-
All Railways	3	-	4	-	7	-
<u>INJURIES</u>						
CN	39	36	56	25	95	61
CP	26	10	8	-	34	10
Other	20	-	14	-	34	-
All Railways	85	46	78	25	163	71

2.3 NUMBER OF COLLISIONS AND CASUALTIES 1977-1984

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Number of Collisions</u>								
CN	40	50	46	47	69	59	61	75
CP	21	14	29	44	36	38	27	23
Other	<u>2</u>	<u>2</u>	<u>5</u>	<u>6</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>1</u>
All Railways	63	66	80	97	108	101	92	99
<u>Number of Casualties</u>								
<u>Fatalities</u>								
CN	-	-	1	-	3	-	2	-
CP	1	-	2	1	-	-	5	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
All Railways	1	-	3	1	3	-	7	-
<u>Injuries</u>								
CN	84	81	48	31	47	127	95	61
CP	4	-	15	21	19	16	34	10
Other	<u>-</u>	<u>2</u>	<u>9</u>	<u>9</u>	<u>1</u>	<u>4</u>	<u>34</u>	<u>-</u>
All Railways	88	83	72	61	67	147	163	71

2.4 THROUGH TRAIN COLLISIONS PER MILLION TRAIN MILES (MTM) (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>CN</u>								
Total Collisions	40	50	46	47	69	59	61	75
Through Train Collisions*					13	15	18	11
MTM	50.7	50.3	41.4	37.9	36.4	30.6	32.7	36.1
Through Train Collisions Per MTM					.36	.49	.55	.30
<u>CP</u>								
Total Collisions	21	14	29	44	36	38	27	23
Through Train Collisions*					8	9	9	3
MTM	29.2	29.9	27.6	27.0	27.2	24.4	24.8	26.2
Through Train Collisions Per MTM					.29	.37	.36	.11
<u>Other</u>								
Total Collisions	2	2	5	6	3	4	4	1
Through Train Collisions*					2	2	2	0
MTM	10.3	10.2	22.6	24.4	22.3	18.9	18.5	20.7 **
Through Train Collisions Per MTM					.09	.11	.11	.00
<u>All Railways</u>								
Total Collisions	63	66	80	97	108	101	92	99
Through Train Collisions*					22	26	29	14
MTM	90.3	90.4	91.6	89.2	85.8	73.9	76.0	83.0 **
Through Train Collisions Per MTM					.26	.35	.38	.17**

* Separate figures are not available for train collisions in prior years.

** Estimated

2.5 COLLISIONS AND CASUALTIES BY PROVINCE (1983-1984)

	<u>1983</u>			<u>1984</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	-	-	-	-	-	-
Prince Edward Island	-	-	-	1	-	-
Nova Scotia	1	-	26	-	-	-
New Brunswick	5	-	-	3	-	-
Quebec	10	-	66	17	-	11
Ontario	17	-	20	28	-	42
Manitoba	3	1	-	7	-	3
Saskatchewan	4	-	2	2	-	-
Alberta	29	5	22	18	-	5
British Columbia	23	1	27	22	-	10
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	1	-	-
CANADA	92	7	163	99	-	71

SECTION 3 Derailments

SECTION 3

DERAILMENTS

(Involving Train Movements Only)

Accidents

A train derailment is an accident where any moving train, engine or car is derailed. Reporting criteria are the same as for collisions: derailments are reportable if they occur on main track with railway property damage above \$750 (or any track if involving dangerous goods traffic or casualty). However, unlike collisions, most reportable derailments occur on through trains as opposed to yard movements (Fig. 3.1).

In 1984, derailments totalled 279, an increase of 9.8% over the 1983 total. Railway traffic in terms of Gross Ton-Miles increased by some 10.5% during the same period. Over 80% of these derailments occurred on through trains, 15.3% higher than a year previously. Derailment of yard movements decreased by 11.5%. Of the 233 through train derailments in 1984, 7 involved passenger trains. In 1983, the corresponding figures were 202 and 6 respectively. Over one-third of all train derailments in 1984 involved cars carrying dangerous commodities (D.C.). Total D.C. related cases increased by 6.4% over the year. 41% of all D.C. related derailments in 1984 occurred in yards. The number of through train derailments per billions of Freight Gross Ton-Miles was 0.71 in 1984 as compared to 0.68 in 1983.

Fig. 3.2 illustrates the breakdown of through train derailments by number of cars and/or engines derailed. It can be seen that approximately half of all through train accidents result in the derailment of only one to two cars/engines. Single and two car/engine derailments also account for some three-fourths of all yard cases (Table 3.7). In 1984, those accidents that resulted in the derailment of over 10 cars accounted for 14 per cent of all train derailments.

Nearly one-fourth of all 1984 derailments were caused by equipment defects. The remaining 76% of derailments were evenly split between those caused by track related defects (or climatological causes) and those due to operations related causes (Fig. 3.3). Derailments due to track and equipment related causes have shown a steady downward trend in recent years due to improvements in maintenance and equipment (Fig. 3.4). Operations related derailments tend to fluctuate from year to year since a major portion of these are the result of rule violations.

Casualties

Derailments as a rule are not serious in terms of casualties; in the past five years train derailments have resulted in only one fatality and this was in 1984. The number of injuries decreased by 36% over the past year, from 42 to 27.

1977 - 84

TRAIN DERAILMENTS

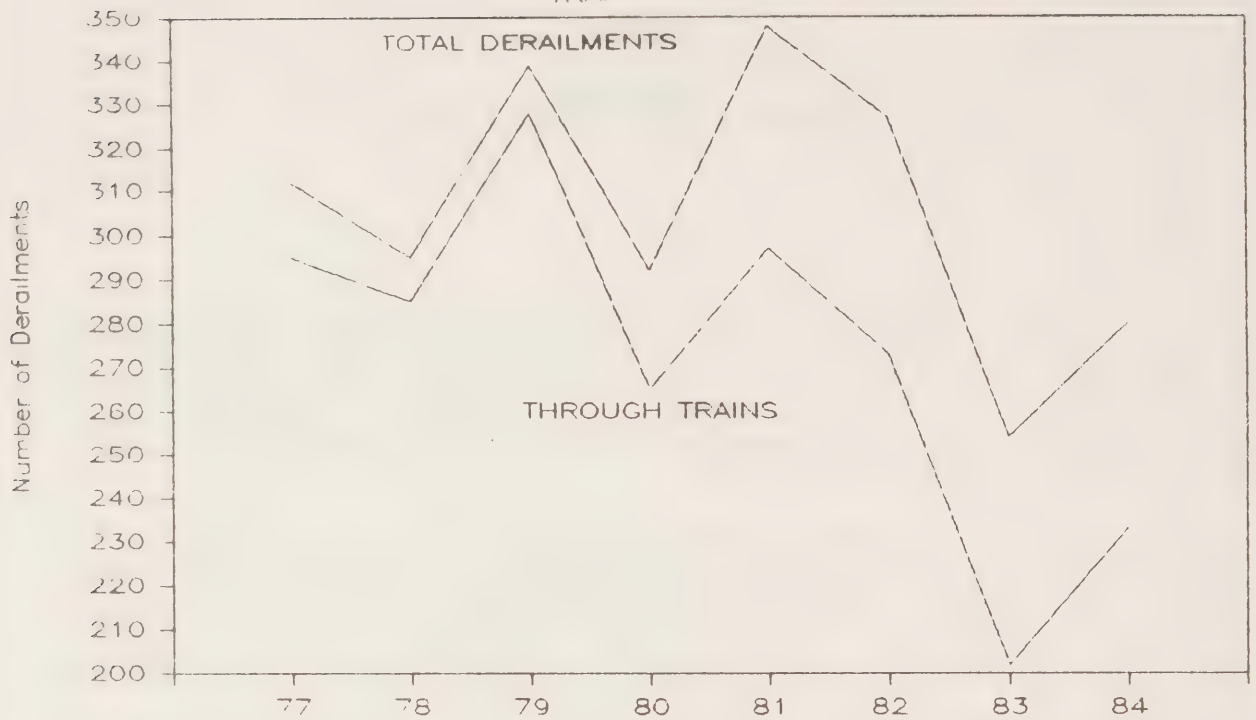


Fig. 3.1

THROUGH TRAIN DERAILMENTS BY # OF CARS/ENGINES DERAILED 1983-84

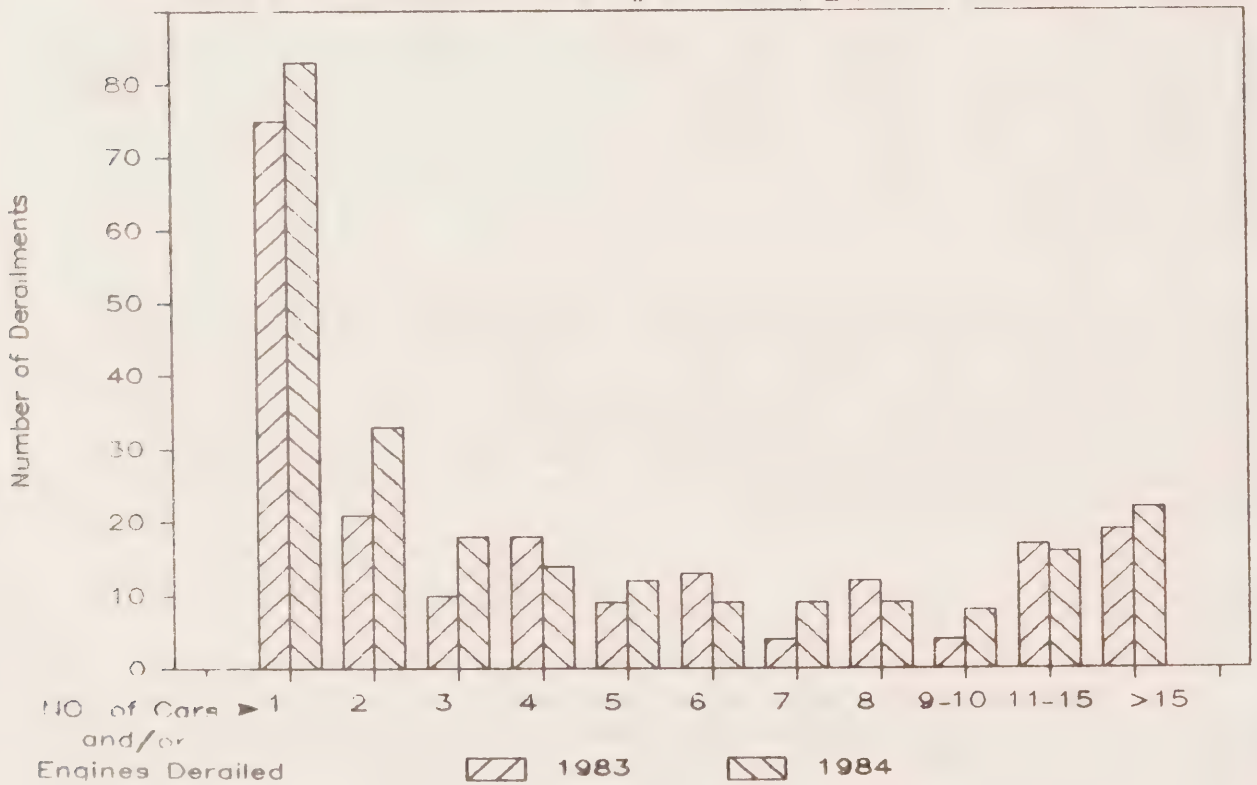


Fig 3.2

1984
DERAILMENTS BY CAUSE

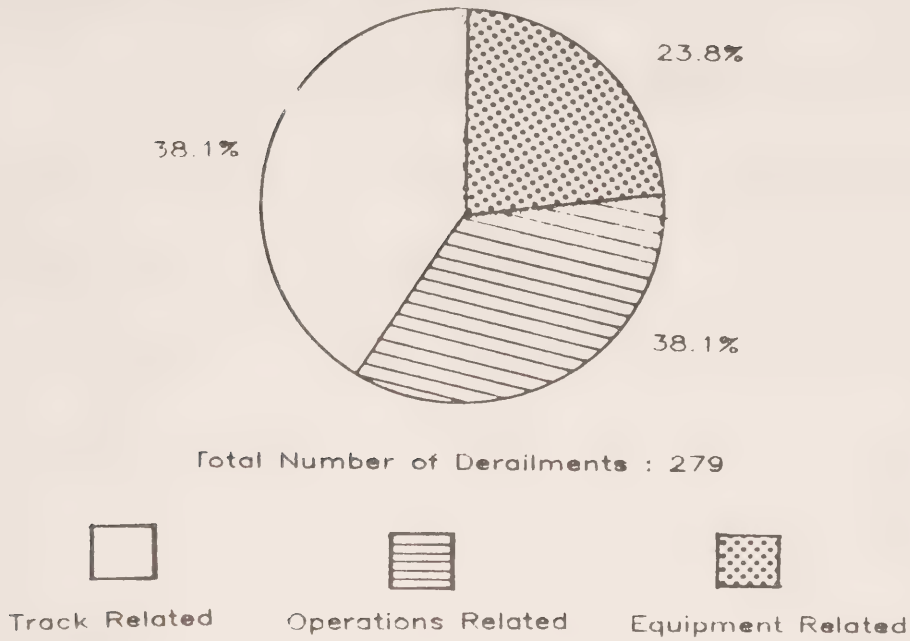


Fig.3.3

1982 - 84
DERAILMENTS BY ASSESSED CAUSE

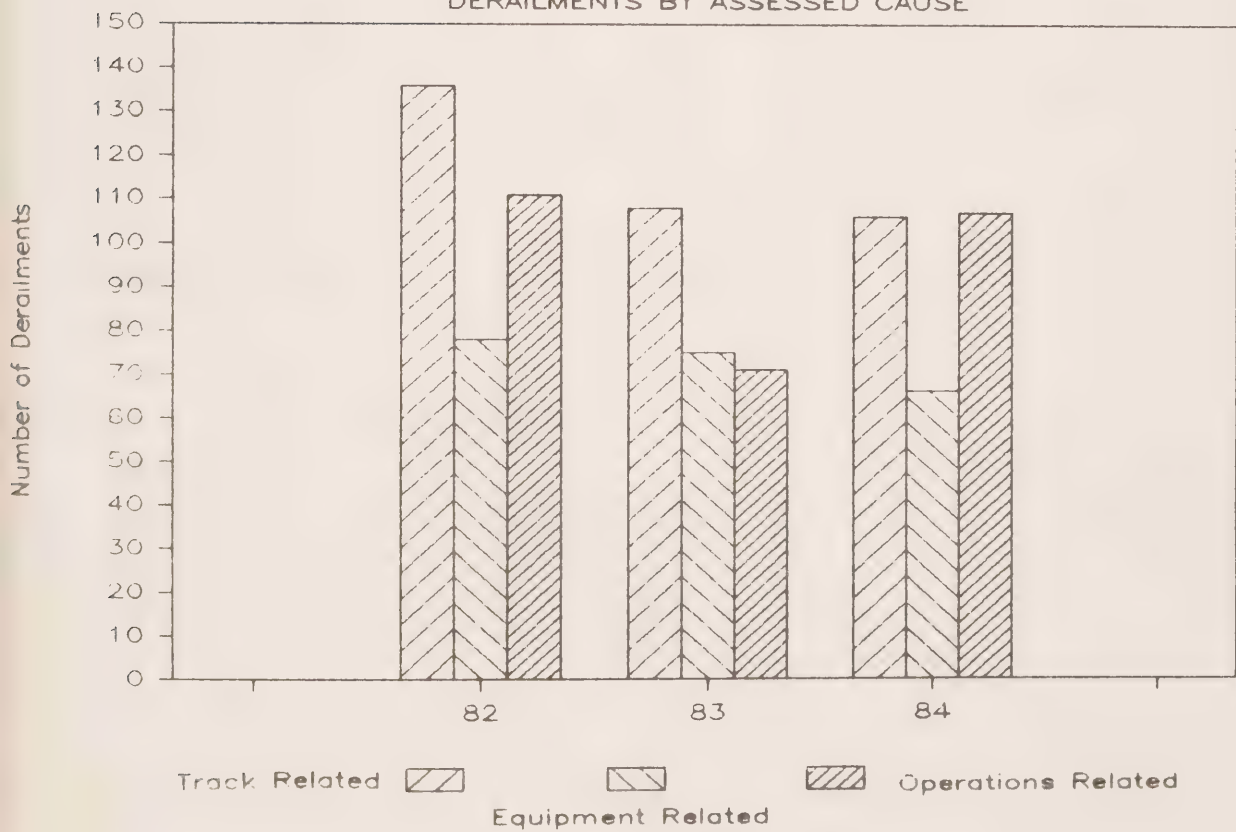


Fig.3.4

SECTION 3

DERAILMENTS

(Involving Train Movements Only)

3.1 NUMBER OF DERAILMENTS (1983 and 1984 Summary)

	<u>All Derailments</u>		<u>D.C. Related Derailment</u>	
	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>
<u>CN</u>				
Through Trains	139	142	28	29
Yard Movements	<u>30</u>	<u>28</u>	<u>29</u>	<u>24</u>
TOTAL	169	170	57	53
<u>CP</u>				
Through Trains	55	78	15	27
Yard Movements	<u>9</u>	<u>10</u>	<u>8</u>	<u>9</u>
TOTAL	64	88	23	36
<u>Other</u>				
Through Trains	8	13	2	3
Yard Movements	<u>13</u>	<u>8</u>	<u>12</u>	<u>8</u>
TOTAL	21	21	14	11

			<u>% Change</u>			<u>% Change</u>
<u>All Railways</u>						
Through Trains	202	233	15.3	45	59	31.1
Yard Movements	<u>52</u>	<u>46</u>	<u>-11.5</u>	<u>49</u>	<u>41</u>	<u>-16.3</u>
TOTAL	254	279	9.8	94	100	6.4

3.2 DERAILMENT CASUALTIES (1983 and 1984 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Total</u>	
	1983	1984	1983	1984	1983	1984
<u>FATALITIES</u>						
CN	-	-	-	-	-	-
CP	-	1	-	-	-	1
Other	-	-	-	-	-	-
All Railways	-	1	-	-	-	1
<u>INJURIES</u>						
CN	17	14	14	-	31	14
CP	4	13	-	-	4	13
Other	<u>1</u>	<u>0</u>	<u>6</u>	<u>-</u>	<u>7</u>	<u>0</u>
All Railways	22	27	20	-	42	27

3.3 DERAILMENT BY CAUSE (1983 and 1984)

	<u>Through Trains</u>		<u>Yard Movements</u>		<u>Total</u>	
	1983	1984	1983	1984	1983	1984
<u>CN</u>						
Track Related	60	58	10	6	70	64
Equipment Related	49	38	1	-	50	38
Operations Related	30	46	19	23	49	69
Undetermined	-	-	-	-	-	-
TOTAL	139	142	30	29	169	171
<u>CP</u>						
Track Related	26	32	2	1	28	33
Equipment Related	20	24	-	-	20	24
Operations Related	9	21	7	9	16	30
Undetermined	-	1	-	-	-	1
TOTAL	55	78	9	10	64	88
<u>Other</u>						
Track Related	4	5	6	4	10	9
Equipment Related	4	4	1	-	5	4
Operations Related	-	4	6	4	6	8
Undetermined	-	-	-	-	-	-
TOTAL	8	13	13	8	21	21

		<u>%</u> <u>Change</u>			<u>%</u> <u>Change</u>			<u>%</u> <u>Change</u>	
<u>All Railways</u>									
Track Related	90	95	5.6	18	11	-38.9	108	106	-1.9
Equipment Related	73	66	-9.6	2	-	-100.0	75	66	-12.0
Operations Related	39	71	82.1	32	35	9.4	71	106	49.3
Undetermined	-	1	-	-	-	-	-	1	-
TOTAL	202	233	15.3	52	46	-11.5	254	279	9.8

3.4 NUMBER OF DERAILMENTS (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>CN</u>								
Through Trains	180	181	232	186	204	176	139	142
Yard Movements	<u>10</u>	<u>7</u>	<u>7</u>	<u>23</u>	<u>32</u>	<u>20</u>	<u>30</u>	<u>28</u>
TOTAL	190	188	239	209	236	196	169	170
<u>CP</u>								
Through Trains	99	84	90	70	82	89	55	78
Yard Movements	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>13</u>	<u>22</u>	<u>9</u>	<u>10</u>
TOTAL	105	86	92	72	95	111	64	88
<u>Other</u>								
Through Trains	16	20	6	9	11	8	8	13
Yard Movements	<u>1</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>6</u>	<u>12</u>	<u>13</u>	<u>8</u>
TOTAL	17	21	8	11	17	20	21	21
<u>All Railways</u>								
Through Trains	295	285	328	265	297	273	202	233
Yard Movements	<u>17</u>	<u>10</u>	<u>11</u>	<u>27</u>	<u>51</u>	<u>54</u>	<u>52</u>	<u>46</u>
TOTAL	312	295	339	292	348	327	254	279

3.5 DERAILMENT CASUALTIES (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Fatalities</u>								
CN	1	2	-	-	-	-	-	-
CP	-	-	1	-	-	-	-	1
Other	-	-	-	-	-	-	-	-
All Railways	1	2	1	-	-	-	-	1
<u>Injuries</u>								
CN	37	25	40	77	83	46	31	14
CP	14	2	33	25	8	49	4	13
Other	-	4	-	1	1	-	7	-
All Railways	51	31	73	103	92	95	42	27

3.6 THROUGH TRAIN DERAILMENTS PER BILLIONS OF FREIGHT GROSS TON-MILES
(FREIGHT BGTM) 1977-1984)

<u>CN</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Total Derailments	190	188	239	209	236	196	169	170
Through Train Derailments	180	181	232	186	204	176	139	142
Freight BGTM	140.9	147.2	155.4	161.0	159.3	139.6	157.7	174.7
Through Train Derailments Per Freight BGTM	1.28	1.23	1.49	1.16	1.28	1.26	0.88	0.81

<u>CP</u>								
Total Derailments	105	86	92	72	95	111	64	88
Through Train Derailments	99	84	90	70	82	89	55	78
Freight BGTM	104.7	110.8	114.7	114.0	119.3	112.8	119.6	127.9
Through Train Derailments Per Freight BGTM	0.95	0.76	0.78	0.61	0.69	0.79	0.46	0.61

<u>Other</u>								
Total Derailments	17	21	8	11	17	20	21	21
Through Train Derailments	16	20	6	9	11	8	8	13
Freight BGTM	36.5	27.3	37.8	33.5	30.6	23.1	21.3	27.1*
Through Train Derailments Per Freight BGTM	0.44	0.73	0.16	0.27	0.36	0.35	0.38	0.48*

<u>11 Railways</u>								
Total Derailments	312	295	339	292	348	327	254	279
Through Train Derailments	295	285	328	265	297	273	202	233
Freight BGTM	282.1	285.2	307.9	308.5	309.2	275.6	298.5	329.7*
Through Train Derailments Per Freight BGTM	1.05	1.00	1.07	0.86	0.96	0.99	0.68	0.71*

Estimated

3.7 DERAILMENTS BY NUMBER OF CARS AND/OR ENGINES DERAILED 1983-1984

No. of Cars and/or Engines Derailed	1983 Derailments		1984 Derailments	
	<u>Through Train</u>	<u>Yard</u>	<u>Through Train</u>	<u>Yard</u>
1	75	25	83	22
2	21	17	33	13
3	10	5	18	3
4	18	2	14	3
5	9	-	12	3
6	13	2	9	-
7	4	-	9	-
8	12	-	9	-
9	3	-	4	1
10	1	-	4	-
11-15	17	-	16	1
Over 15	<u>19</u>	<u>1</u>	<u>22</u>	<u>-</u>
TOTAL	202	52	233	46

3.8 DERAILMENTS AND CASUALTIES BY PROVINCE (1983-1984)

	<u>1983</u>			<u>1984</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	10	-	-	7	-	-
Prince Edward Island	-	-	-	-	-	-
Nova Scotia	8	-	-	6	-	-
New Brunswick	14	-	1	15	-	-
Quebec	33	-	25	38	-	2
Ontario	80	-	10	67	-	3
Manitoba	17	-	-	11	-	3
Saskatchewan	12	-	3	26	-	5
Alberta	33	-	-	40	1	8
British Columbia	46	-	3	69	-	6
Yukon	-	-	-	-	-	-
North West Territories	1	-	-	-	-	-
CANADA	254	-	42	279	1	27

SECTION 4 Crossing Accidents

SECTION 4

CROSSING ACCIDENTS

Accidents

A crossing accident is one where any unit of rolling stock on the rails strikes or is struck by a user of a public, private or farm crossing, and damage or injury results. All accidents at public crossings are reportable, private or farm crossings being reportable only if they involve a casualty.

There were a total of 595 reportable crossing accidents in 1984; an increase of 4.9% over 1983. The ratio of accidents to work performed decreased, however, since the number of railway train-miles performed increased by nearly 11% during the same period. Fig. 4.1 shows a steady downward trend in the absolute crossing accident totals between the years 1979 to 1983. The majority of all reportable crossing accidents are at public crossings. There were 563 such accidents in 1984 with accidents at protected crossings slightly outnumbering those at unprotected crossings. This is in contrast to the actual number of public highway/railway grade crossings in Canada; in 1984, unprotected public crossings outnumbered those with protections by a ratio of 3:1 (Fig. 4.2). However, protected crossings have much greater train and vehicular traffic than unprotected crossings and this produces greater accident risk.

In absolute numbers, Ontario, Quebec and Alberta accounted for over two-thirds of the 563 public crossing accidents in 1984. However, these three provinces also accounted for almost half of the some 28,700 public highway/railway grade crossings in Canada. Fig. 4.3(a) shows, by province, the number of accidents at public crossings as a ratio of the total number of public grade crossings. For Canada as a whole, there were approximately 2 accidents for every 100 crossings. Quebec, B.C. and Ontario had values well above the national average whereas accident ratios for the Atlantic and the Prairie provinces were either similar or well below the value for Canada.

Unprotected crossings account for nearly three-fourths of the total public crossings in Canada. Fig 4.3(b) illustrates the accident ratios with respect to protected and unprotected public crossings: the values for Canada were 3.8 and 1.3 accidents respectively for every 100 crossings. However, unprotected crossings are not used as frequently as protected crossings. Looking at the accident ratios at protected crossings therefore, as a better indicator of relative safety performance, it can be seen that although Ontario accounted for the largest number of protected crossing accidents in 1984, its record was better than Quebec and all the Western provinces except for Saskatchewan.

Fig. 4.4 illustrates the fluctuation in crossing accidents by time of year. As expected, the winter period is the most critical owing to the unpredictable driving conditions. In 1984, the months of January, February and December accounted for a little over one-third of all crossing accidents. The graph also indicates minor peaks during certain summer/fall months presumably because of the increased volume of holiday traffic.

Two out of every three crossing accidents occur during the day. The variation in accidents by time of day is shown in Fig. 4.5. The graph indicates a higher probability for an accident occurring during the mid-day hours owing to the larger volume of motor-vehicle traffic during this time period. Accidents appear to taper off by mid-afternoon after which the 'after-office' rush hour accounts for another very high peak in crossing accidents. It is interesting to note that the morning rush hour is not as critical since drivers presumably are more alert at this time. Accidents during the late evening hours may be attributable to factors such as fatigue and alcohol consumption. The numbers are fairly constant during these hours and there is a minor peak at 1:00 A.M. at which time late night businesses close; accidents then drastically drop in number until the morning.

Crossing accidents in which a train strikes the vehicle outnumber by 3 to 2 those accidents where the vehicle strikes the train. Fig. 4.6 is a graphical representation of crossing accidents by impact type. The figure illustrates the percentage breakdown of impact type by day and night and then takes the breakdown one step further by subdividing the above accidents into those occurring at protected and unprotected crossings. Consider for example, crossing accidents where the train strikes the vehicle. The graph reveals that during the day there was no appreciable difference between the number of accidents at protected crossings and unprotected crossings. It is interesting to note, however, that during the night the proportion of accidents at protected crossings was significantly greater.

Of the rolling stock involved in crossing accidents 86% were freight trains and 11% were passenger trains. The rest involved movements of track motor cars and maintenance of way equipment. Table 4.2 looks at crossing accidents by type of vehicle. Approximately one-fourth of all vehicle registrations are trucks and buses (74% being passenger vehicles) and yet nearly one-third of all crossing accidents involved trucks. The table shows that the percentage of such accidents attributable to trucks was even larger when one considers only those cases where the train struck the vehicle. The figures might suggest that the drivers of such vehicles are more likely to take chances at railway crossings rather than those who drive passenger vehicles, especially when the crossing is clear of rolling stock.

The risk of D.C. involvement in a crossing accident is considerably less than that in a derailment or collision. Over the years, D.C. related crossing accidents have always amounted to less than 2% of the total reportable crossing accident totals. Crossing accidents generally do not result in a derailment. There were 11 such cases in 1984 as compared to 18 in 1983.

There were 40 crossing accidents per million motor vehicle registrations in 1984 compared to a figure of 39 for 1983. The ratio of crossing accidents per million train-miles was 7.17 in 1984 as compared to a figure of 7.46 a year previously.

Casualties

It is interesting to note that the majority of crossing accidents do not result in any casualties (Fig. 4.7). In 1984, 34% of all crossing accidents resulted in injuries while only 8% resulted in fatalities. There were 50 fatality related crossing accidents in 1984 and these resulted in 69 fatalities. In 1983 there were also 50 related fatality crossing accidents but these resulted in only 58 fatalities. Fig. 4.8 shows the frequency distribution for crossing fatalities and the accidents causing them. For example in 1984, there were 39 single fatality accidents, 6 accidents with 2 fatalities each, 4 accidents with 3 fatalities and 1 with 6 fatalities (the last being an accident where a car struck a train on March 30, 1984 at Milton, Ontario resulting in 6 killed and 1 injured). In 1984, total fatalities increased by some 19% but this was mainly due to the multiple fatality accidents as illustrated above.

Although crossing accidents account for most of the railway related fatalities, it is not railway employees or passengers who are killed. In 1984, 96% of crossing fatalities were motor vehicle occupants; the remainder being mainly contractors and pedestrians. Motor vehicle occupants also accounted for some 88% of total injuries at railway crossings. In total, there were 292 crossing accident injuries in 1984, a slight increase over the 286 injuries in 1983.

1977 - 84

NUMBER OF CROSSING ACCIDENTS

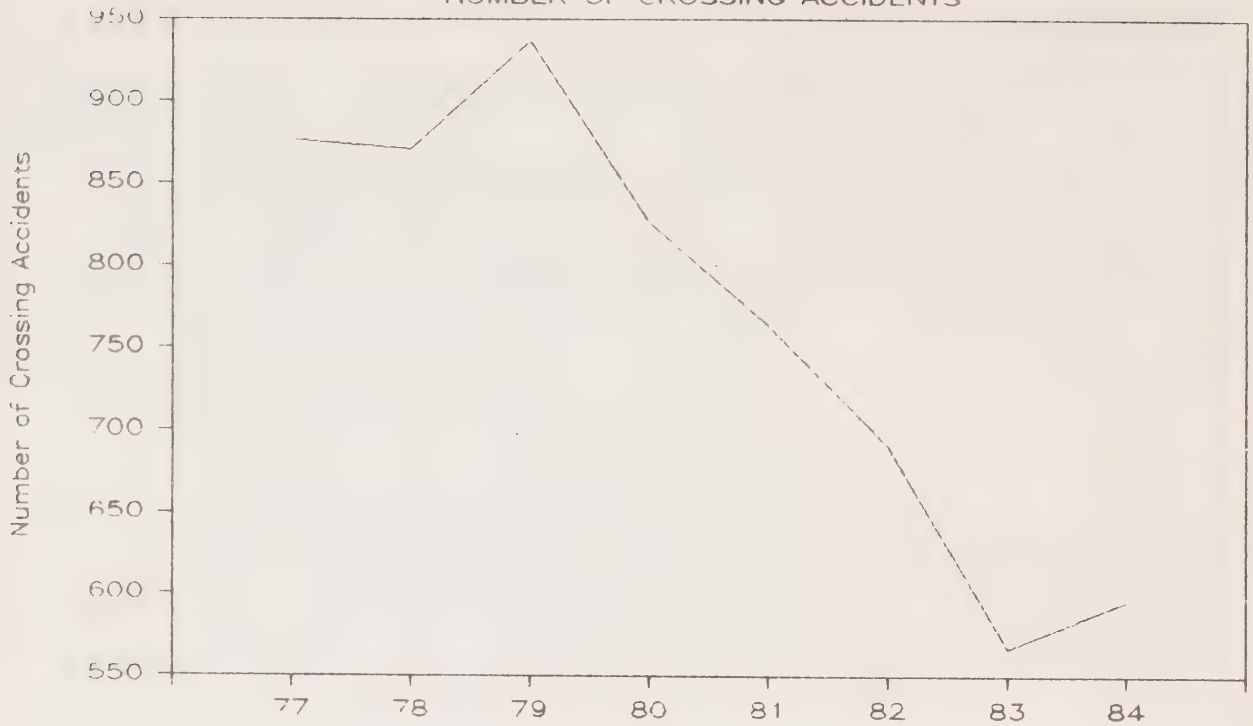


Fig 4.1

1982 - 84

ACC AT PUBLIC XINGS BY PROTECTION

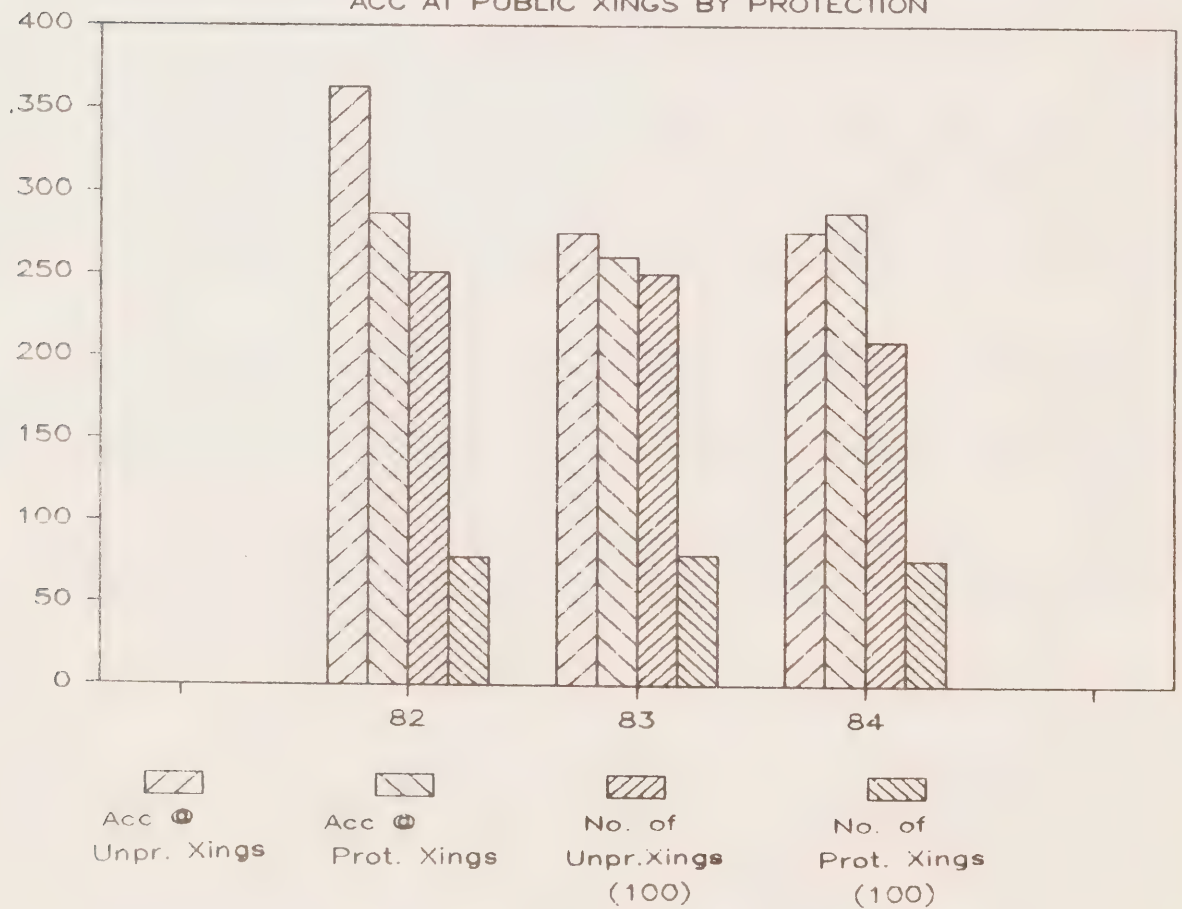


Fig.4.2

TOTAL PUBLIC XING ACC/TOTAL NO.OF PUBLIC XINGS 1984

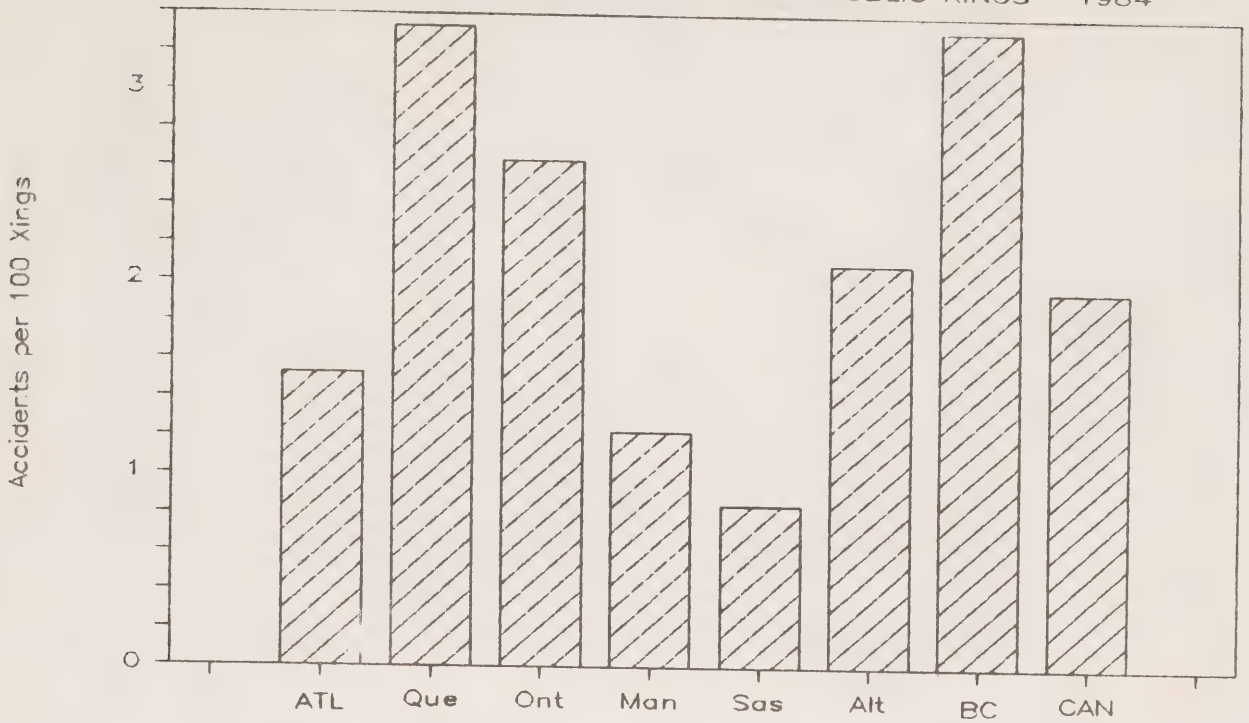


Fig.4.3(a)

PROT.PUBLIC XING ACC/NO.OF PROT.PUBLIC XINGS &
UNPRO. PUBLIC XING ACC/NO.OF UNPRO. PUBLIC XINGS 1984

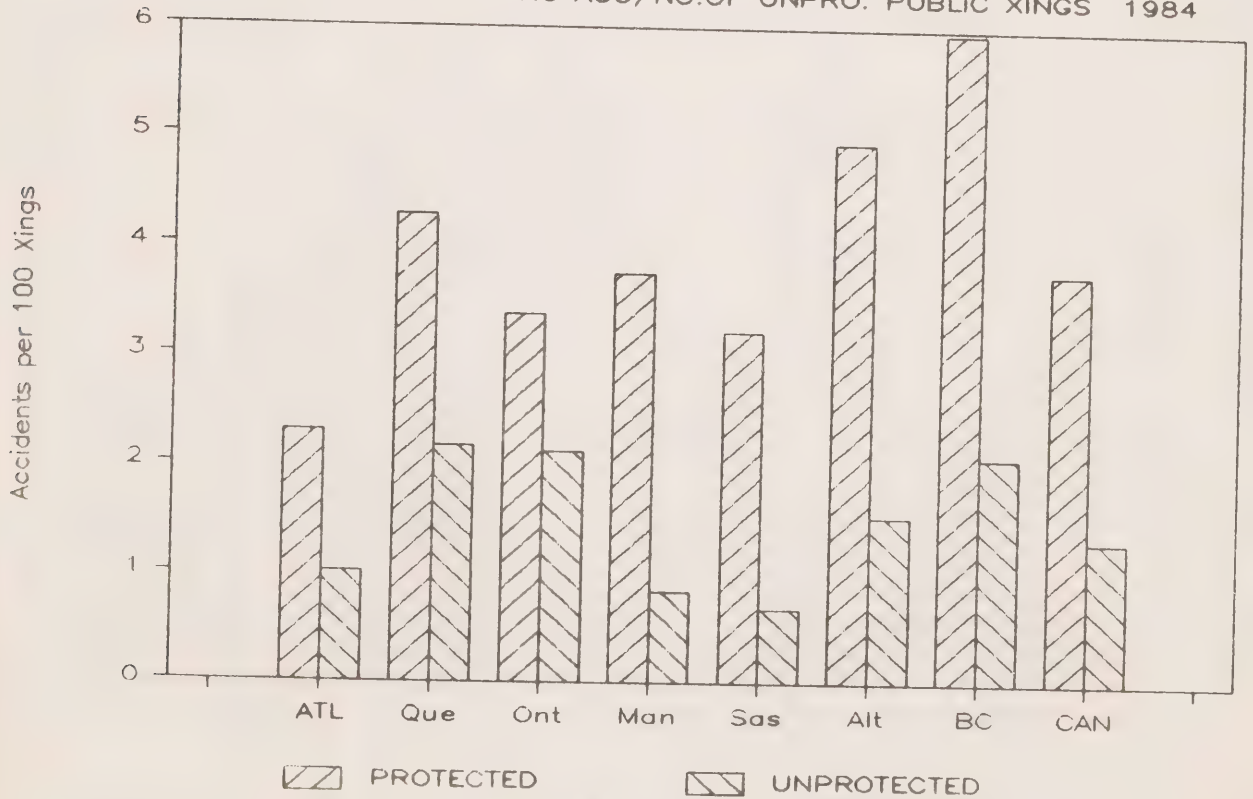


Fig.4.3(b)

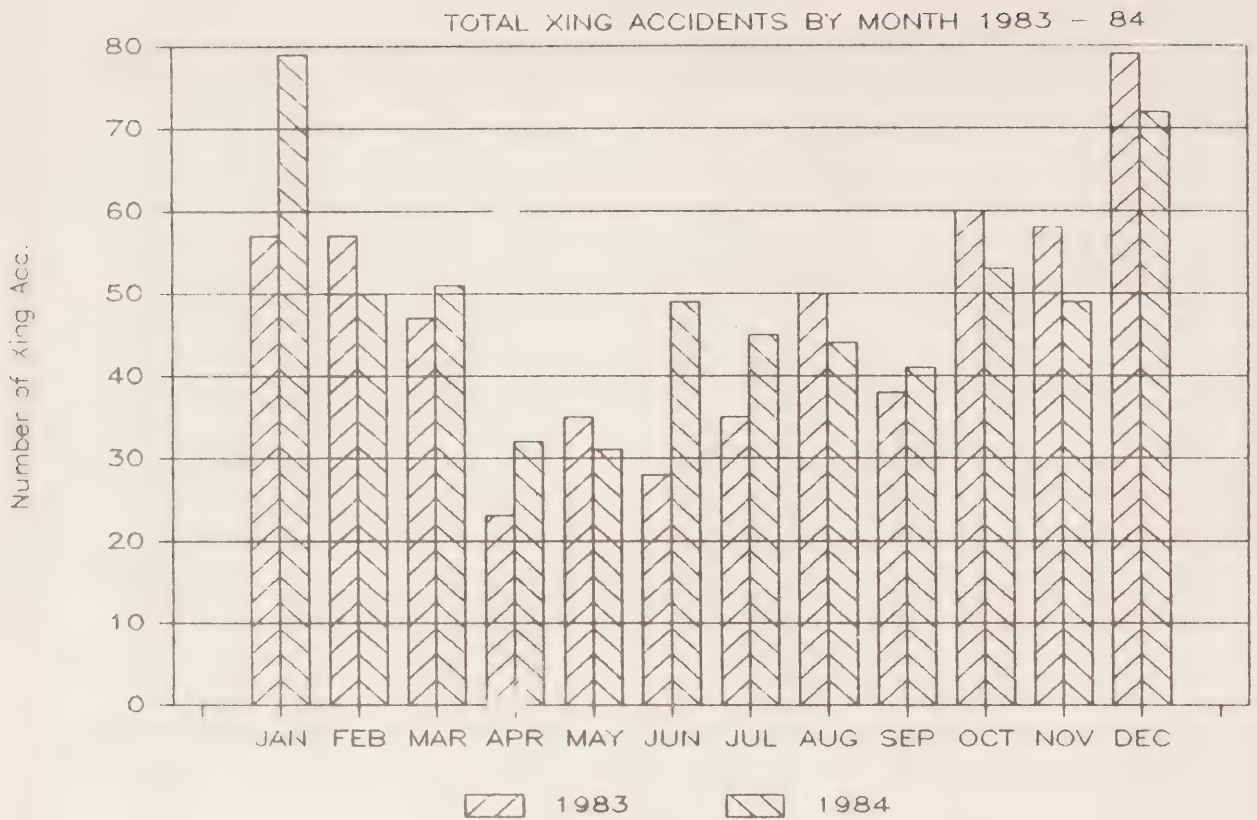


Fig.4.4

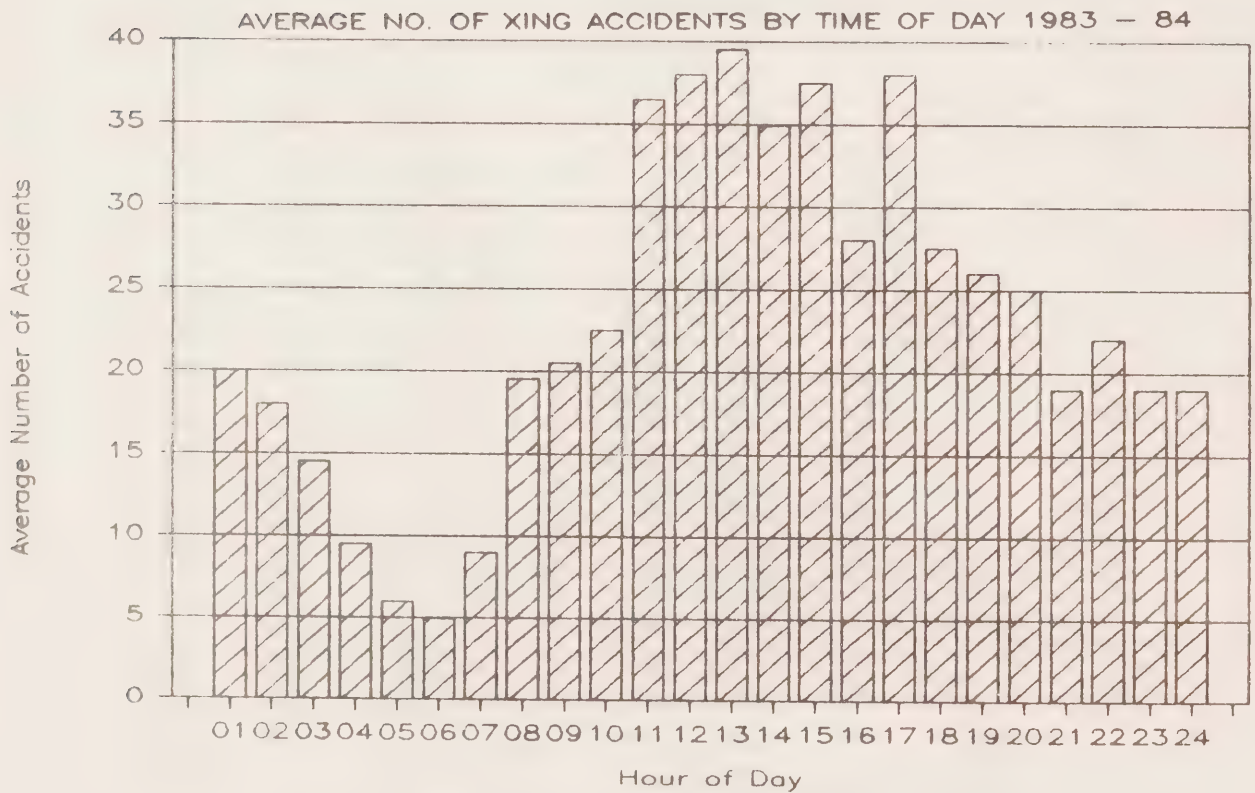


Fig.4.5

XING ACCIDENTS BY IMPACT - 1984

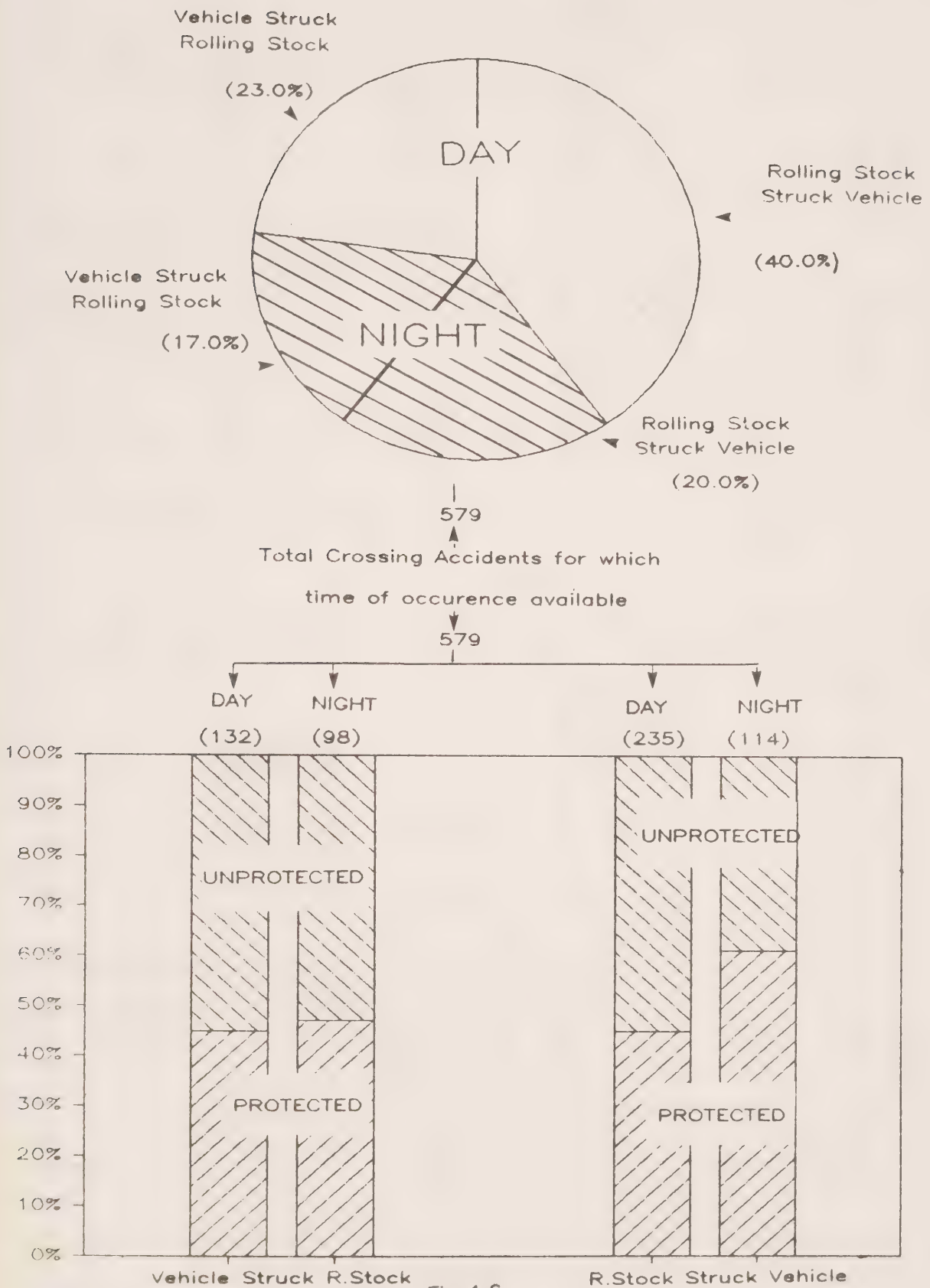


Fig. 4.6

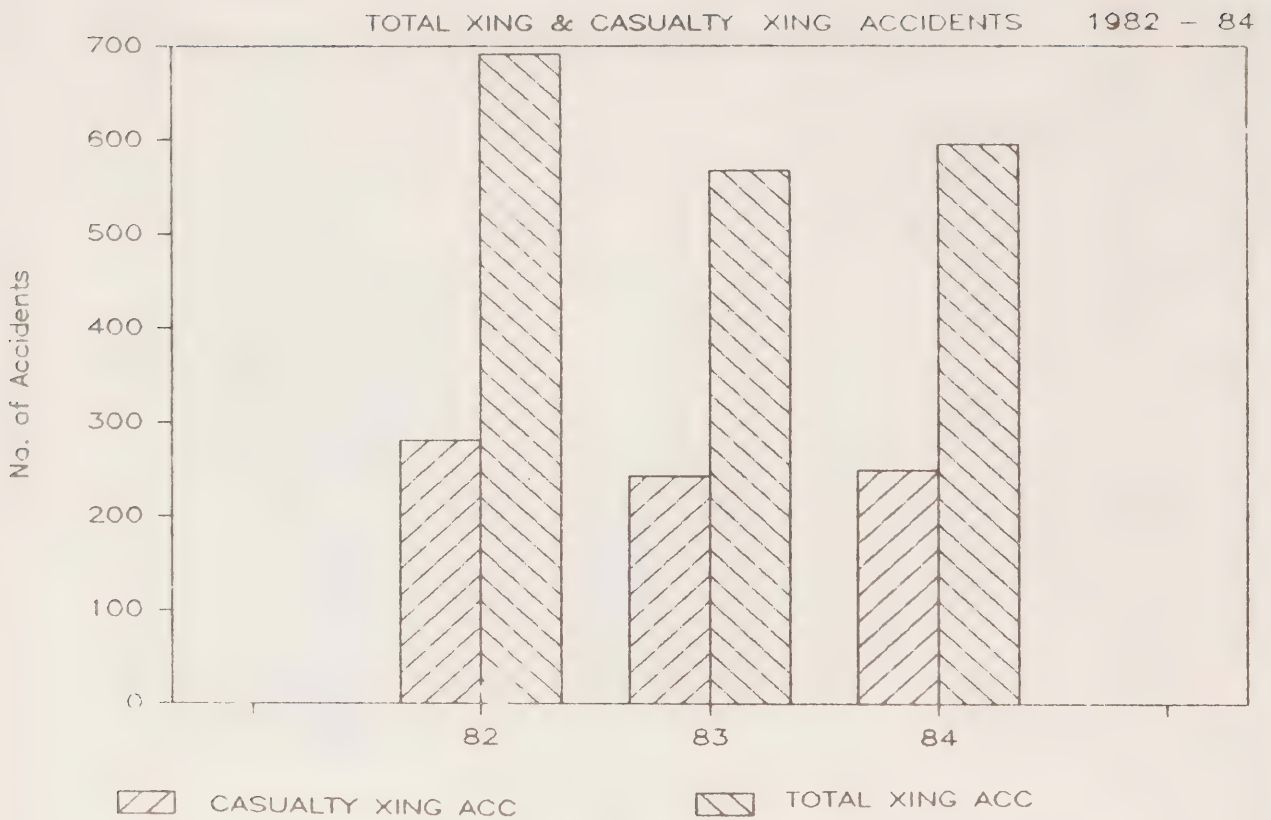


Fig.4.7

FREQUENCY DISTRIBUTION OF FATALITIES & XING ACC. CAUSING THEM 1982 - 84

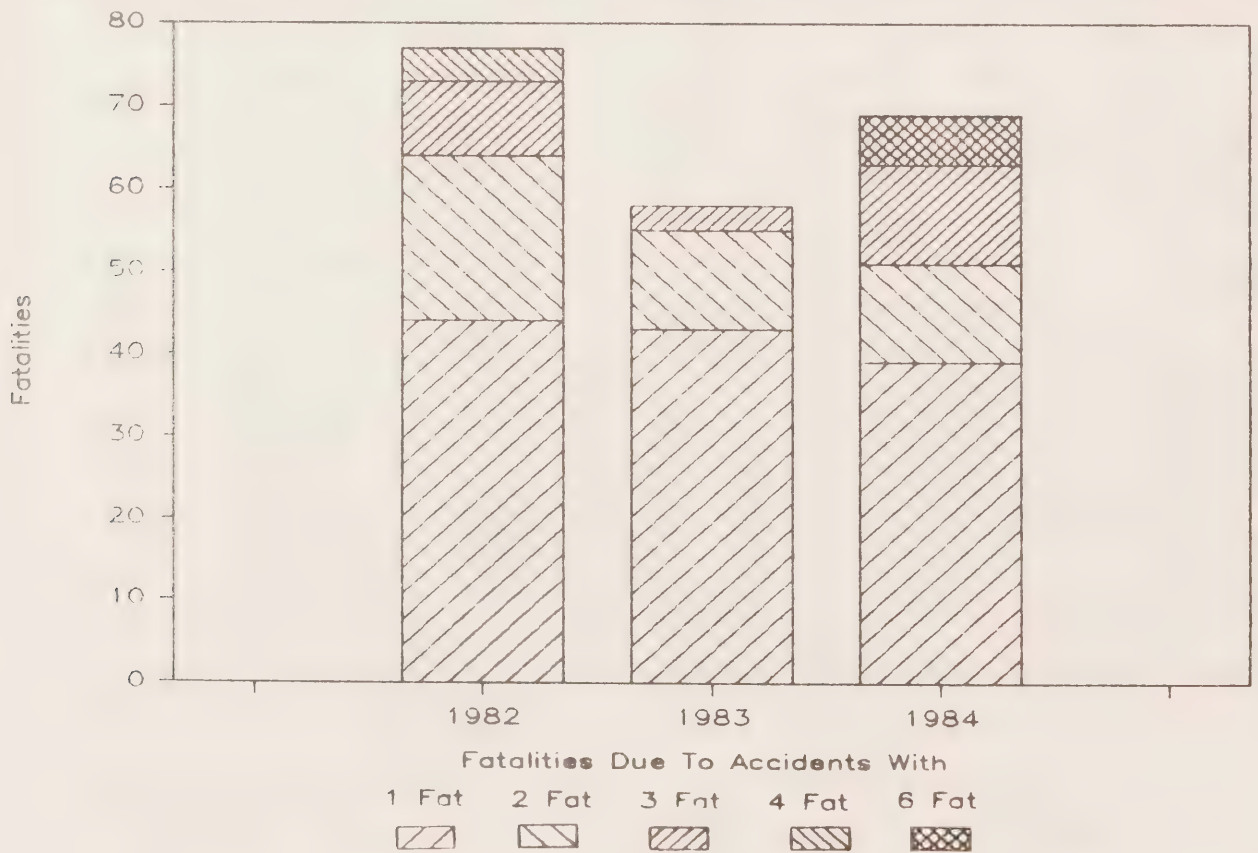


Fig 4.8

SECTION 4

CROSSING ACCIDENTS

4.1 CROSSING ACCIDENTS BY RAILWAY (1984 Summary)

	<u>CN</u>	<u>CP</u>	<u>OTHER</u>	<u>ALL RAILWAYS</u> <u>TOTAL</u>	<u>%</u>
<u>Crossing Accidents by Type of Crossing</u>					
Protected	157	116	15	288	49
Unprotected	164	102	9	275	46
Farm Crossing	5	1	-	6	1
Private Crossing	<u>17</u>	<u>8</u>	<u>1</u>	<u>26</u>	<u>4</u>
TOTAL	343	227	25	595	100

Crossing Accidents by Province

Nfld.	2	-	-	2	1
PEI	5	-	-	5	1
NS	9	6	2	17	3
NB	8	8	-	16	3
Que.	93	28	1	122	20
Ont.	112	66	15	193	32
Man.	18	25	-	43	7
Sask.	33	28	-	61	10
Alta.	44	46	-	90	15
BC	19	20	7	46	8
Yukon	-	-	-	-	-
N.W.T.	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	343	227	25	595	100

Crossing Accidents by Time of Year

January, February and December	119	76	6	201	34
March - November	<u>224</u>	<u>151</u>	<u>19</u>	<u>394</u>	<u>66</u>
TOTAL	343	227	25	595	100

4.1 CROSSING ACCIDENTS BY RAILWAY (1984 Summary) (Cont'd)

	<u>CN</u>	<u>CP</u>	<u>OTHER</u>	<u>ALL RAILWAYS TOTAL</u>	<u>%</u>
<u>Crossing Accidents by Time of Day</u>					
Day	206	150	11	367	63*
Night	129	72	11	212	37*
Unknown	<u>8</u>	<u>5</u>	<u>3</u>	<u>16</u>	
TOTAL	343	227	25	595	100
<u>Crossing Accidents by Type of Collision</u>					
Train Struck Vehicle	205	137	12	354	60
Vehicle Struck Train	<u>138</u>	<u>90</u>	<u>13</u>	<u>241</u>	<u>40</u>
TOTAL	343	227	25	595	100
<u>Crossing Accidents by Type of Rolling Stock</u>					
Passenger	36	8	1	45	7
RDC	6	18	-	24	4
Freight	288	191	24	503	85
Plow	4	1	-	5	1
TMC	5	7	-	12	2
Highrail	-	-	-	-	-
M.W.E.	<u>4</u>	<u>2</u>	<u>-</u>	<u>6</u>	<u>1</u>
TOTAL	343	227	25	595	100
<u>Crossing Accidents by Type of Casualty</u>					
Resulting in Injury	114	72	13	199	34
Resulting in Fatality	30	19	1	50	8
Non-Casualty	<u>199</u>	<u>136</u>	<u>11</u>	<u>346</u>	<u>58</u>
TOTAL	343	227	25	595	100

* Percentages based on the 579 accidents for which the time of occurrence was available.

4.2 CROSSING ACCIDENTS BY TYPE OF VEHICLE (1984)

	Accidents: Rolling Stock Striking Vehicle		Accidents: Vehicle Striking Rolling Stock		Accidents: All		Motor Vehicle Registration
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>%</u>
Passenger automobiles	216	61	171	71	387	65	74
Trucks & buses	125	35	68	28	193	32	23
Motorcycles, bicycles	3	1	3	1	6	1	3
Pedestrians, other persons	<u>9</u>	<u>3</u>	<u>-</u>	<u>-</u>	<u>9</u>	<u>2</u>	<u>-</u>
Total	353	100	242	100	595	100	100

*Based on figures for 1981-83.

4.3 CROSSING ACCIDENTS (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Casualty Accidents</u>								
Public Crossings	318	298	350	318	287	240	214	217
Private Crossings	32	28	37	27	25	32	25	26
Farm Crossings	<u>9</u>	<u>10</u>	<u>7</u>	<u>7</u>	<u>6</u>	<u>9</u>	<u>4</u>	<u>6</u>
TOTAL	359	336	394	352	318	281	243	249
<u>Non-Casualty Accidents</u>								
Public Crossings	518	521	525	459	436	410	322	346
Private Crossings	-	14	18	10	4	-	2	-
Farm Crossings	<u>-</u>	<u>-</u>	<u>-</u>	<u>5</u>	<u>5</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	518	535	543	474	445	410	324	346
<u>All Accidents</u>								
Public Crossings	836	819	875	777	723	650	536	563
Private Crossings	32	42	55	37	29	32	27	26
Farm Crossings	<u>9</u>	<u>10</u>	<u>7</u>	<u>12</u>	<u>11</u>	<u>9</u>	<u>4</u>	<u>6</u>
TOTAL	877	871	937	826	763	691	567	595

4.4 CROSSING CASUALTIES (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Fatalities</u>								
Motor Vehicle Occupants	80	87	90	70	78	72	54	66
Railway Employees	1	2	-	1	1	1	-	2*
Railway Passengers	-	-	-	-	-	-	-	-
Pedestrians	<u>6</u>	<u>-</u>	<u>8</u>	<u>12</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>1</u>
TOTAL	87	89	98	83	82	77	58	69
<u>Injuries</u>								
Motor Vehicle Occupants	389	374	402	341	355	290	244	258
Railway Employees	42	35	39	40	42	30	30	18
Railway Passengers	19	6	3	45	51	34	5	9
Pedestrians	<u>3</u>	<u>-</u>	<u>8</u>	<u>9</u>	<u>3</u>	<u>3</u>	<u>7</u>	<u>7</u>
TOTAL	453	415	452	435	451	357	286	292

* Includes 1 contractor

4.5 CROSSING ACCIDENTS: MISCELLANEOUS RATIOS (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Total Accidents	877	871	937	826	763	691	567	595
Cases with Derailment	16	17	19	20	13	11	18	11
%	1.8	2.0	2.0	2.4	1.7	1.6	3.2	1.8
Cases with D.C.	1	-	2	11	4	8	9	10
%	0.1	-	0.2	1.3	0.5	1.2	1.6	1.7
Millions of Motor Vehicle Registrations (MMVR)	12.5	13.0	13.3	13.7	13.9	14.3	14.6	15.0*
Crossing Acc./MMVR	70	67	70	60	55	48	39	40*
Million Train-Miles (MTM)	90.3	89.7	91.6	89.2	85.8	73.9	76.0	83.0*
Crossing Acc./MTM	9.71	9.71	10.23	9.26	8.89	9.35	7.46	7.17*

*Estimated

4.6 CROSSING ACCIDENTS AND CASUALTIES BY PROVINCE (1983-1984)

	<u>1983</u>			<u>1984</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	4	1	1	2	-	-
Prince Edward Island	3	-	-	5	-	10
Nova Scotia	15	1	13	17	-	10
New Brunswick	13	1	5	16	-	10
Quebec	95	9	52	122	20	63
Ontario	226	24	109	193	24	93
Manitoba	30	3	15	43	9	22
Saskatchewan	51	7	26	61	5	19
Alberta	77	7	39	90	7	46
British Columbia	53	5	26	46	4	19
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	-	-	-
CANADA	567	58	286	595	69	292

SECTION 5 Track Motor Car and Maintenance of
Way Equipment Collisions/Derailments

SECTION 5

TRACK MOTOR CAR AND MAINTENANCE OF WAY EQUIPMENT COLLISIONS/DERAILMENTS

Accidents

This section tabulates collisions/derailments involving on-track work equipment such as track motor cars and maintenance of way equipment.

Collisions between or involving such equipment numbered 28 in 1984, a decrease of 22.2% from 1983.

There were 18 on-track equipment derailments in 1984 which is that same as the total in 1983. Most of these derailments involved track motor cars.

Casualties

In 1984, on-track equipment collisions/derailments resulted in 57 injuries; these type of accidents did not cause any fatalities. Collisions accounted for two-thirds of all injuries. In 1983 these types of accidents resulted in one fatality and 74 injuries.

SECTION 5

TRACK MOTOR CAR (TMC) AND MAINTENANCE OF WAY EQUIPMENT (MWE) COLLISIONS/DERAILMENTS

5.1 NUMBER OF COLLISIONS AND CASUALTIES (1983 and 1984 SUMMARY)

	Collisions			Casualties*			
				Injured		Killed	
	1983	1984		1983	1984	1983	1984
<u>TMC-TMC, TMC-MWE and MWE-MWE</u>							
CN	8	6		15	21	-	-
CP	8	2		15	6	-	-
Other	-	1		-	-	-	-
TOTAL	16	9		30	27	-	-
<u>TMC-Train and MWE-Train</u>							
CN	13	11		15	3	-	-
CP	6	7		3	7	-	-
Other	1	1		-	-	-	-
TOTAL	20	19		18	10	-	-
<div> <div>%</div> <div>Change</div> </div>							
<u>TOTAL All Types</u>							
CN	21	17	-19.0	30	24	-	-
CP	14	9	-35.7	18	13	-	-
Other	1	2	100.0	-	-	-	-
TOTAL	36	28	-22.2	48	37	-	-

* All Casualties are employees.

5.2 TOTAL OF ALL TMC AND MWE: COLLISIONS AND CASUALTIES (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Collisions</u>								
CN	33	32	22	25	34	30	21	17
CP	15	12	9	16	16	12	14	9
Other	<u>7</u>	<u>6</u>	<u>5</u>	<u>8</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>2</u>
TOTAL	55	50	36	49	53	43	36	28

Casualties

Fatalities

CN	-	-	-	1	-	4	-	-
CP	-	1	-	1	1	-	-	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	-	1	-	2	1	4	-	-

Injuries

CN	34	50	30	25	65	22	30	24
CP	15	10	19	18	14	8	18	13
Other	<u>4</u>	<u>5</u>	<u>8</u>	<u>17</u>	<u>4</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	53	65	57	60	83	30	48	37

5.3 NUMBER OF DERAILMENTS AND CASUALTIES (1983 and 1984 Summary)

	<u>Derailments</u>		<u>Casualties*</u>			
	<u>1983</u>	<u>1984</u>	<u>Injuries</u>		<u>Fatalities</u>	
			<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>
<u>TMC</u>						
CN	3	2	6	2	-	-
CP	12	10	18	15	1	-
Other	-	-	-	-	-	-
TOTAL	15	12	24	17	1	-
<u>MWE</u>						
CN	-	3	-	1	-	-
CP	2	2	2	2	-	-
Other	-	-	-	-	-	-
TOTAL	2	5	2	3	-	-

TOTAL All Types

			<u>% Change</u>				
CN	3	5	66.7	6	3	-	-
CP	14	12	-14.3	20	17	1	-
Other	-	-	-	-	-	-	-
TOTAL	17	17	0.0	26	20	1	-

* All casualties are employees.

5.4 TOTAL OF ALL TMC AND MWE: DERAILMENTS AND CASUALTIES (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Derailments</u>								
CN	11	12	19	6	2	4	3	5
CP	7	10	11	25	11	12	14	12
Other	<u>-</u>	<u>-</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>-</u>	<u>-</u>
TOTAL	18	22	32	32	16	18	17	17
<u>Casualties</u>								
<u>Fatalities</u>								
CN	-	-	1	-	-	-	-	-
CP	-	-	-	-	-	-	1	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	-	-	1	-	1	-	1	-
<u>Injuries</u>								
CN	22	16	27	8	2	5	6	3
CP	7	13	14	31	12	20	20	17
Other	<u>-</u>	<u>-</u>	<u>7</u>	<u>1</u>	<u>3</u>	<u>6</u>	<u>-</u>	<u>-</u>
TOTAL	29	29	48	40	17	31	26	20

5.5 TMC/MWE COLLISIONS-DERAILMENTS AND CASUALTIES BY PROVINCE (1983-1984)

	<u>1983</u>			<u>1984</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	1	-	1	-	-	-
Prince Edward Island	-	-	-	-	-	-
Nova Scotia	1	-	-	-	-	-
New Brunswick	-	-	-	1	-	-
Quebec	2	-	5	2	-	1
Ontario	24	-	21	18	-	22
Manitoba	4	-	11	2	-	1
Saskatchewan	2	-	2	-	-	-
Alberta	7	-	9	8	-	10
British Columbia	12	1	25	14	-	23
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	-	-	-
CANADA	53	1	74	45	-	57

SECTION 6 Train Service Accidents

SECTION 6

TRAIN SERVICE ACCIDENTS

Accidents

Train Service Accidents from 1981 onwards, as shown in this report, represent persons (including trespassers) sustaining injuries or dying as a result of being struck by rolling stock or employees injured while in the process of entraining/detraining rolling stock.

In 1984, there were 572 such accidents and this was 18.6% lower than the figure in 1983. Three-fourths of these involved railway employees getting off/on rolling stock.

Casualties

Train Service Accidents accounted for 51 fatalities in 1984 (this was 41% of all railway accident fatalities). Most of these fatalities were trespassers and suicides. Train Service Accident fatalities numbered 53 in 1983. This category of accidents also resulted in 525 injuries in 1984, as compared to 652 in 1983. The majority of these are injuries to employees getting off/on rolling stock.

SECTION 6

TRAIN SERVICE ACCIDENTS

6.1 TRAIN SERVICE ACCIDENTS AND CASUALTIES (1983 and 1984 Summary)

	<u>1983</u>	<u>1984</u>	<u>% Change</u>
<u>Accidents</u>			
Employees/Other struck by Rolling Stock	35	38	8.6
Passengers struck by Rolling Stock	-	-	-
Trespassers struck by Rolling Stock	111	101	-9.0
Employees getting off/on Rolling Stock	<u>557</u>	<u>433</u>	<u>-22.3</u>
TOTAL	703	572	-18.6

Casualties

i) Fatalities

Employees struck by Rolling Stock	6	8*
Passengers struck by Rolling Stock	-	-
Trespassers struck by Rolling Stock	47	43
Employees getting off/on Rolling Stock	<u>-</u>	<u>-</u>
TOTAL	53	51

ii) Injuries

Employees struck by Rolling Stock	30	32**
Passengers struck by Rolling Stock	-	-
Trespassers struck by Rolling Stock	65	60
Employees getting off/on Rolling Stock	<u>557</u>	<u>433</u>
TOTAL	652	525

* Includes 1 retired employee

** Includes 1 contractor

6.2 TRAIN SERVICE ACCIDENTS AND CASUALTIES (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Accidents</u>								
Employees/Other struck by Rolling Stock*	52	51	48	32	28	29	35	38
Trespassers struck by Rolling Stock	82	105	82	177	109	91	111	101
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>
TOTAL					729	614	703	572
<u>Casualties</u>								
<u>Fatalities</u>								
Employees struck by Rolling Stock*	2	5	5	6	4**	7	6	8**
Trespassers struck by Rolling Stock	44	54	51	97	58	50	47	43
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL					62	57	53	51
<u>Injuries</u>								
Employees struck by Rolling Stock*	3	29	46	25	24	22	30	32**
Trespassers struck by Rolling Stock	38	51	34	80	46	40	65	60
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>
TOTAL					662	556	652	525

* These totals may include the rare case of a passenger being struck by rolling stock.

** Includes 1 non-employee accident.

*** See footnote to Table 1.2.

6.3 TRESPASSERS/SUICIDES BY PROVINCE (1983-1984)

	<u>1983</u>			<u>1984</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	1	-	1	-	-	-
Prince Edward Island	-	-	-	1	1	-
Nova Scotia	7	1	6	3	1	2
New Brunswick	1	-	1	-	-	-
Quebec	17	8	10	16	6	11
Ontario	48	24	24	38	18	20
Manitoba	9	4	5	4	2	2
Saskatchewan	2	1	1	5	2	3
Alberta	10	4	6	11	4	7
British Columbia	16	5	11	23	9	15
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	-	-	-
CANADA	111	47	65	101	43	60

SECTION 7 Incidents

SECTION 7

INCIDENTS

Incidents

Incidents include fires, cases of dangerous commodity leakages (not always related to train movements) and other occurrences of a miscellaneous nature. Examples of the latter category include:

- personal injuries to employees or passengers such as striking against or being hit by an obstacle; burns; exposure; sprains, inhalation; etc.
- disruptions of service, washouts, obstructions to track, not resulting in a train accident.
- damage to bridges, culverts, other structures not due to train accidents but including fire damage.

There were 231 fires in 1984 which is a decrease of 9.1% from 1983. The majority of fires are on right of way and these in turn are dependent on climatic conditions and to a lesser degree on vandalism.

D.C. leakage incidents in this section are specifically those that arise in the transportation of dangerous commodities other than due to train accidents. The latter are already included in the figures presented in earlier sections of this report. D.C. leakages totalled 419 in 1984. The considerable increase in the last two years relates mainly to more stringent inspection.

All other incidents amounted to 2,560 in 1984, compared to 2,383 in 1983. 97% of these incidents were miscellaneous injuries sustained by employees and passengers not related to train accidents.

Casualties

Fires and D.C. incidents accounted for only 9 injuries in 1984. The vast majority of the 2,504 miscellaneous incident injuries were due to "other incidents" as defined earlier. Over four-fifths of these "other incidents" were personal injuries to employees, with passenger injuries accounting for a further 16%. It should be pointed out that there is no minimum severity for reporting. Injuries can range from a loss of a limb to a minor slip or fall.

SECTION 7

INCIDENTS

7.1 INCIDENTS AND CASUALTIES (1983 and 1984 Summary)

	<u>Incidents</u>			<u>Fatalities</u>		<u>Injuries</u>	
	<u>1983</u>	<u>1984</u>	<u>% Change</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>
<u>Fires</u>							
Fires on Right of Way	221	207		-	-	-	-
Fires on Rolling Stock	24	17		-	-	5	3
Fires on Structures	<u>9</u>	<u>7</u>		<u>-</u>	<u>-</u>	<u>-</u>	<u>1</u>
TOTAL	254	231	-9.1	-	-	5	4
 <u>Dangerous Commodity Incidents*</u>							
	288	419	45.5	-	-	7	5
 <u>Other Miscellaneous Incidents</u>							
Involving Employees only	1,801	2,060		-	-	1,803	2,072
Involving Passengers only	431	396		-	-	431	397
Other Incidents**	<u>151</u>	<u>104</u>		<u>6</u>	<u>2</u>	<u>48</u>	<u>26</u>
TOTAL	<u>2,383</u>	<u>2,560</u>	<u>7.3</u>	<u>6</u>	<u>2</u>	<u>2,282</u>	<u>2,495</u>
TOTAL INCIDENTS	2,925	3,210	9.7	6	2	2,294	2,504

* These totals relate to incidents involving the transportation of dangerous commodities other than in train accidents. The large increase relates mainly to more stringent inspection and reporting, with many of these leakages of a minor nature.

** 1983 data includes 3 non-employee fatalities, 12 non-employee injuries and 1 passenger injury. All other casualties are employees.
1984 data includes 2 non-employee injuries. All other casualties are employees.

7.2 INCIDENTS AND CASUALTIES (1977-1984)

	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
<u>Incidents</u>								
Fires	450	240	246	229	221	273	254	231
D.C.	30	47	51	107	157	105	288	419
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,560</u>
TOTAL					3,264	3,189	2,925	3,210
<u>Casualties</u>								
<u>Fatalities</u>								
Fires	-	-	-	-	-	-	-	-
D.C.	-	-	-	-	-	-	-	-
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>5</u>	<u>8</u>	<u>6</u>	<u>2</u>
TOTAL					5	8	6	2
<u>Injuries</u>								
Fires	-	-	-	-	3	6	5	4
D.C.	1	1	6	23	1	1	7	5
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,861</u>	<u>2,743</u>	<u>2,282</u>	<u>2,495</u>
TOTAL					2,865	2,750	2,294	2,504

* See Footnotes to Table 1.2

7.2 NOMBRE D'INCIDENTS ET DE VICTIMES (1977 - 1984)

	1977	1978	1979	1980	1981	1982	1983	1984
Incidents	450	240	246	229	221	273	254	231
Incendies								
Marchandises								
dangereuses	30	47	51	107	157	105	288	419
Tous les autres	S/O	S/O	S/O	S/O	2,886	2,811	2,383	2,560
TOTAL					3,264	3,189	2,925	3,210
Victimes								
Morts								
Incendies	-	-	-	-	-	-	-	-
Marchandises	-	-	-	-	-	-	-	-
dangereuses	-	-	-	-	-	-	-	-
Tous les autres	S/O	S/O	S/O	S/O	5	8	6	2
TOTAL					5	8	6	2
Blessés								
Incendies	-	-	-	-	3	6	5	4
Marchandises								
dangereuses	1	1	6	23	1	1	7	5
Tous les autres	S/O	S/O	S/O	S/O	2,861	2,743	2,282	2,495
TOTAL					2,865	2,750	2,294	2,504

* Voir la remarque figurant au tableau 1.2.

PARTIE 7

INCIDENTS

7.1 INCIDENTS ET VICTIMES/BLESSÉS (Relevé pour 1983 et 1984)

Incidents	Incidents		Variation en %
	1983	1984	
Morts	1983	1984	
Blessés	1983	1984	

Incidents sur les servitudes de passage	221	207	-	-	-	-
Incidents dans le matériel roulant	24	17	-	-	-	3
Incidents dans les structures	9	7	-	-	-	1
TOTAL	254	231	-9,1	-	-	4
Incidents des marchandises dangereuses	288	419	45,5	-	-	5
Autres incidents divers	1,801	2,060	-	-	-	2,072
employés	431	396	-	-	-	397
passagers	151	104	-	-	-	26
Autres incidents	2,383	2,560	7,3	6	2	2,495
TOTAL	2,925	3,210	9,7	6	2	2,504
NOMBRE TOTAL D'INCIDENTS	2,925	3,210	9,7	6	2	2,504

Ces totaux concernent les incidents mettant en cause le transport de marchandises dangereuses, mais qui ne sont pas le résultat d'accidents de train. L'augmentation considérable est essentiellement attribuable au fait que les inspections et les exigences de rapport sont plus rigoureuses dont plusieurs de ces suites sont de genres mineurs.

Les données de 1983 tiennent compte de 3 victimes et de 12 blessés qui n'étaient pas des employés et d'un passager blessé; toutes les autres victimes l'étaient.

PARTIE 7

INCIDENTS

Incidents

Les incidents comprennent les incendies, les fuites de produits dangereux (qui ne sont pas toujours reliées aux trains en déplacement) et les autres événements de nature diverse. Voici des exemples de cette dernière catégorie:

- les blessures subies par des employés ou des passagers qui se heurtent contre un obstacle ou qui se font frapper, qui subissent des brûlures, des foulures, qui sont exposés à des marchandises dangereuses, qui en inhalent les vapeurs, etc.

- les interruptions de service, les glissements, les obstacles sur la voie, etc. qui ne provoquent pas d'accidents de train.

- les dommages aux ponts, aux ouvrages de drainage et aux autres structures qui ne sont pas causés par des accidents de train, mais qui comprennent les dommages dus à un incendie.

Il y a eu 231 incendies en 1984, soit 9,1 p. 100 de moins qu'en 1983. La plupart ont eu lieu sur les servitudes de passage et sont attribuables aux conditions atmosphériques ou, à un degré moindre, au vandalisme.

Les fuites de marchandises dangereuses visées dans la présente partie sont très précisément celles qui ont lieu lors du transport de marchandises dangereuses, et qui ne sont pas causées par des accidents de train. Les fuites causées par des accidents de train sont traitées dans les autres parties du présent rapport. Au total, il y a eu 419 fuites de marchandises dangereuses en 1984. L'augmentation considérable des fuites depuis deux ans est essentiellement attribuable au fait que les inspections sont plus rigoureuses.

Les autres incidents divers étaient au nombre de 2 560 en 1984, comparativement à 2 383 en 1983. De ces incidents, 97 p. 100 sont des blessures subies par des employés et des passagers qui ne sont pas victimes d'un accident de train.

Victimes

Seulement neuf personnes ont subi des blessures en 1984 à la suite d'incendies ou de fuites de marchandises dangereuses. La plupart des 2 504 victimes d'incidents divers ont subi des blessures de la catégorie des "autres incidents" susmentionnée. Plus de quatre cinquième de ces "autres incidents" consistent en des blessures qui ont été infligées à des employés, tandis que 16 p. 100 sont des blessures subies par des passagers. Notons qu'il n'y a pas de critères minimums quant à la sévérité des blessures pour que celles-ci fassent l'objet d'un rapport; on peut donc tout signaler, depuis la simple chute jusqu'à la perte d'un membre.

INCIDENTS

PARTIE 7

6.3 INTRUS/SUICIDES PAR PROVINCE (1983-84)

1983				1984			
Accidents	Morts	Blessés		Accidents	Morts	Blessés	
T.-N.	1	-	1	-	-	-	-
I.P.-E.	-	-	-	1	1	-	-
N.-E.	7	1	6	3	1	2	-
N.-B.	1	-	1	-	-	-	-
Qué.	17	8	10	16	6	11	11
Ont.	48	24	24	38	18	20	20
Man.	9	4	5	4	2	2	2
Sask.	2	1	1	5	2	3	3
Alb.	10	4	6	11	4	7	7
C.-B.	16	5	11	23	9	15	15
Yukon	-	-	-	-	-	-	-
T.N.-O.	-	-	-	-	-	-	-
Canada	111	47	65	101	43	60	

6.2 NOMBRE D'ACCIDENTS RELATIFS AU SERVICE DE TRAIN ET DES VICTIMES (1977-1984)

	Accidents						
	1977	1978	1979	1980	1981	1982	1983
Victimes							
	EmploYES/autres frappés par du matériel roulant*	52	51	48	32	28	29
	Intrus frappés par du matériel roulant	82	105	82	177	109	91
	EmploYES descendant de matériel roulant ou y montant***	S/O	S/O	S/O	592	494	557
Morts							
	EmploYES frappés par du matériel roulant*	2	5	5	6	4**	7
	Intrus frappés par du matériel roulant	44	54	51	97	58	50
	EmploYES descendant de matériel roulant ou y montant***	S/O	S/O	S/O	S/O	-	-
Blessés							
	EmploYES frappés par du matériel roulant*	3	29	46	25	24	22
	Intrus frappés par du matériel roulant	38	51	34	80	46	40
	EmploYES descendant de matériel roulant ou y montant***	S/O	S/O	S/O	592	494	557
* Ces totaux peuvent comprendre, le cas très rare d'un passager frappé par du matériel roulant.							
** Y compris un accident qui a fait une victime chez une personne autre qu'un employé.							
*** Voir la remarque figurant au tableau 1.2							

PARTIE 6

ACCIDENTS RELATIFS AU SERVICE DE TRAIN

6.1 NOMBRE D'ACCIDENTS RELATIFS AU SERVICE DE TRAIN ET DE VICTIMES (Relève pour 1983 et 1984)

Accidents		1983	1984	Variation en %
TOTAL				
Employés/autres frappés par du matériel roulant		35	38	8,6
Passagers frappés par du matériel roulant		-	-	-
Intrus frappés par du matériel roulant		111	101	-9,0
Employés descendant du matériel roulant ou y montant		557	433	-22,3
Victimes				
Morts				
Employés frappés par du matériel roulant		6	8*	
Passagers frappés par du matériel roulant		-	-	
Intrus frappés par du matériel roulant		47	43	
Employés descendant du matériel roulant ou y montant		-	-	
TOTAL				
Blessés		53	51	
Employés frappés par du matériel roulant		30	32**	
Passagers frappés par du matériel roulant		-	-	
Intrus frappés par du matériel roulant		65	60	
Employés descendant du matériel roulant ou y montant		557	433	
TOTAL				
		652	525	

* Y compris un employé en retraite.
** Y compris un employé sous contrat.

PARTIE 6

ACCIDENTS RELATIFS AU SERVICE DE TRAIN

Accidents

Comme l'indique le présent rapport, les accidents relatifs au service de train depuis 1981 indiquent les personnes (y compris les intrus) qui ont subi des blessures ou qui sont mortes après avoir été frappées par du matériel roulant ou des employés blessés alors qu'ils montaient dans du matériel roulant ou en descendant.

En 1984, il y a eu 572 accidents relatifs au service de train, soit 18,6 p. 100 de moins qu'en 1983. Les trois quarts de ces accidents touchaient des employés des compagnies ferroviaires qui montaient à bord du matériel roulant ou qui en descendant.

Victimes

Les accidents relatifs au service de train ont fait 51 morts en 1984 (ce qui représente 41 % de tous les décès survenus dans des accidents ferroviaires). Dans la plupart des cas les décès s'agissaient de suicides ou d'intrus. Le nombre de décès dus à des accidents relatifs au service de train ont fait 53 morts en 1983. En 1984 ce type d'accident avait fait 525 blessés alors qu'en 1983 on a compté 652 blessés. Dans la plupart des cas, ces blessures s'agissaient d'employés qui montaient à bord du matériel roulant ou qui en descendant.

ACCIDENTS RELATIFS AU SERVICE DE TRAIN

PARTIE 6

5.5 COLLISIONS/DÉRAILLEMENTS DES DRAISINES ET DES MACHINES D'ENTRETIEN DE LA VOIE PAR PROVINCE (1983-84)

1983				1984			
Canada	Accidents	Morts	Blessés	Accidents	Morts	Blessés	
T.-N.	1	-	1	-	-	-	
I.P.-E.	-	-	-	-	-	-	
N.-E.	1	-	-	-	-	-	
N.-B.	-	-	-	1	-	-	
Qué.	2	-	5	2	-	1	
Ont.	24	-	21	18	-	22	
Man.	4	-	11	2	-	1	
Sask.	2	-	2	-	-	-	
Alb.	7	-	9	8	-	10	
C.-B.	12	1	25	14	-	23	
Yukon	-	-	-	-	-	-	
T.N.-O.	-	-	-	-	-	-	
	53	1	74	45	-	57	

5.4 NOMBRE TOTAL DE DÉRAILLEMENTS ET DE VICTIMES RELATIFS AUX DRAISINES
ET MEV (1977-1984)

Déraillements							
1977	1978	1979	1980	1981	1982	1983	1984
Victimes							
Morts							
CN	11	12	19	6	2	4	5
CP	7	10	11	25	11	12	12
Autres	-	-	2	1	3	2	-
TOTAL	18	22	32	32	16	18	17
Blessés							
CN	-	-	1	-	-	-	-
CP	-	-	-	-	-	1	-
Autres	-	-	-	-	1	-	-
TOTAL	-	-	1	-	1	1	-
TOTAL							
CN	22	16	27	8	2	5	3
CP	7	13	14	31	12	20	17
Autres	-	-	7	1	3	6	-
TOTAL	29	29	48	40	17	31	20

5.3 NOMBRE DE DÉRAILLEMENTS ET DE VICTIMES (Relève pour 1983 et 1984)

Déraillements		Victimes	
1983	1984	1983	1984
Draisières		Blessés	
CN	3	2	6
CP	12	15	18
Autres	-	-	-
TOTAL	15	17	24
MEV			
CN	-	1	-
CP	2	2	-
Autres	-	-	-
TOTAL	2	3	-
TOTAL pour toutes les sortes			
Variation en %			
CN	3	6	66,7
CP	14	20	-14,3
Autres	-	-	-
TOTAL	17	26	0,0

* Tous les victimes sont des employés.

5.2 NOMBRE TOTAL DE COLLISIONS ET DE VICTIMES RELATIVES AUX DRAISINES
ET MÉV (1977 à 1984)

Collisions							
Victimes							
Morts							
Bllessés							
CN	CP	Autres	TOTAL	CN	CP	Autres	TOTAL
1977	1978	1979	1980	1981	1982	1983	1984
33	32	22	25	34	30	21	17
15	12	9	16	16	12	14	9
7	6	5	8	3	1	1	2
55	50	36	49	53	43	36	28
TOTAL							
Bllessés							
CN	CP	Autres	TOTAL	CN	CP	Autres	TOTAL
1977	1978	1979	1980	1981	1982	1983	1984
-	-	-	1	-	4	-	-
-	1	-	1	1	-	-	-
-	-	-	-	-	-	-	-
1	1	2	1	4	-	-	-
Bllessés							
CN	CP	Autres	TOTAL	CN	CP	Autres	TOTAL
1977	1978	1979	1980	1981	1982	1983	1984
34	50	30	25	65	22	30	24
15	10	19	18	14	8	18	13
4	5	8	17	4	-	-	-
53	65	57	60	83	30	48	37
TOTAL							

PARTIE 5

COLLISIONS/DÉRAILLEMENTS DES DRAISINES ET DES MACHINES D'ENTRETIEN DE LA
VOIE (MEV)

5.1 NOMBRE DE COLLISIONS ET DE VICTIMES (Relevé pour 1983 et 1984)

Collisions				Victimes*			
1983		1984		1983		1984	
				Blessés		Morts	
				Draisine-			
				Draisine,			
				Draisine-MEV,			
				MEV-MEV			
CN		8		15		21	
CP		8		15		6	
Autres		1		-		-	
TOTAL		16		30		27	
				Draisine-Train			
				et MEV-Train			
CN		13		15		-	
CP		6		3		-	
Autres		1		-		-	
TOTAL		20		18		10	

PARTIE 5

COLLISIONS/DÉRAILLEMENTS DES DRAISINES ET DES MACHINES
D'ENTRETIEN DE LA VOIE

Accidents

Cette partie donne un aperçu tabulaire des collisions/dérailements d'équipement de travail sur la voie, tel que les draisines et des machines d'entretien de la voie.

Le nombre de collisions mettant en cause de tels véhicules s'est élevé à 28 en 1984, ce qui représente une baisse de 22,2 p. 100 par rapport à 1983.

En 1984, on a enregistré 18 dérailements d'équipement circulant sur la voie soit le même nombre qu'en 1983. Les draisines ont mis en cause de la plupart de ces dérailements.

Victimes

En 1984, les collisions/dérailements de l'équipement de travail acheminé sur la voie ont fait 57 blessés et aucun mort. Les collisions étaient à l'origine de deux-tiers des blessures. En 1983, ces accidents avaient fait un mort et 74 blessés.

COLLISIONS/DÉRAILLEMENTS DES DRAISINES ET DES MACHINES
D'ENTRETIEN DE LA VOIE

PARTIE 5

4.6 NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU ET VICTIMES PAR PROVINCE (1983-84)

1983			1984		
Accidents	Morts	Blessés	Accidents	Morts	Blessés
<hr/>					
T.-N.	4	1	2	-	-
I.P.-E.	3	-	5	-	10
N.-E.	15	1	17	-	10
N.-B.	13	1	16	-	10
Qué.	95	9	122	20	63
Ont.	226	24	193	24	93
Man.	30	3	43	9	22
Sask.	51	7	61	5	19
Alb.	77	7	90	7	46
C.-B.	53	5	46	4	19
Yukon	-	-	-	-	-
T.N.-O.	-	-	-	-	-
<hr/>					
Canada	567	58	595	69	292

4.5 ACCIDENTS AUX PASSAGES À VINEAU: DIVERS RAPPORTS (1977-1984)

	1977	1978	1979	1980	1981	1982	1983	1984
Nombre total d'accidents aux passages à niveau	877	871	937	826	763	691	567	595
Cas avec déraillement	16	17	19	20	13	11	18	11
%	1,8	2,0	2,0	2,4	1,7	1,6	3,2	1,8
Cas avec des marchandises dangereuses	1	-	2	11	4	8	9	10
%	0,1	-	0,2	1,3	0,5	1,2	1,6	1,7
Véhicules à moteur immatriculés (en millions)	12,5	13,0	13,3	13,7	13,9	14,3	14,6	15,0*
Accidents aux passages à niveau par million de véhicules à moteur immatriculés	70	67	70	60	55	48	39	40*
Millions de trains-milles	90,3	89,7	91,6	89,2	85,8	73,9	76,0	83,0*
Accidents aux passages à niveau par million de trains-milles	9,71	9,71	10,23	9,26	8,89	9,35	7,46	7,17*
*Estimé								

4.4 NOMBRE DE VICTIMES D'ACCIDENTS AUX PASSAGES À NIVEAU (1977 à 1984)

Morts	1977	1978	1979	1980	1981	1982	1983	1984
Occupants de véhicules	80	87	90	70	78	72	54	66
à moteur								
Employés de								
compagnies								
ferroviaires	1	2	-	1	1	1	-	2*
Passagers	-	-	-	-	-	-	-	-
Piétons	6	-	8	12	3	4	4	1
TOTAL	87	89	98	83	82	77	58	69
Blessés								
Occupants de véhicules	389	374	402	341	355	290	244	258
à moteur								
Employés de								
compagnies								
ferroviaires	42	35	39	40	42	30	30	18
Passagers	19	6	3	45	51	34	5	9
Piétons	3	-	8	9	3	3	7	7
TOTAL	453	415	452	435	451	357	286	292

*Y compris un employé sous contrat.

4.3 NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU (1977 à 1984)

	1977	1978	1979	1980	1981	1982	1983	1984
Accidents faisant des victimes								
Passages à niveau publics	318	298	350	318	287	240	214	217
Passages à niveau privés	32	28	37	27	25	32	25	26
Passages à niveau de ferme	9	10	7	7	6	9	4	6
TOTAL	359	336	394	352	318	281	243	249
Accidents ne faisant aucune victime								
Passages à niveau publics	518	521	525	459	436	410	322	346
Passages à niveau privés	-	14	18	10	4	-	2	-
Passages à niveau de ferme	-	-	-	5	5	-	-	-
TOTAL	518	535	543	474	445	410	324	346
Tous les accidents aux passages à niveau								
Passages à niveau publics	836	819	875	777	723	650	536	563
Passages à niveau privés	32	42	55	37	29	32	27	26
Passages à niveau de ferme	9	10	7	12	11	9	4	6
TOTAL	877	871	937	826	763	691	567	595

1.2 ACCIDENTS AUX PASSAGES À NIVEAU PAR SORTIE DE VÉHICULE (1984)

Véhicules à moteur immatriculés	Accidents: Total		Accidents: matériel frappant véhicule roulant		Accidents: matériel roulant frappant un véhicule		Véhicules à moteurs camions et autobus	Motocyclettes et piétons et autres individus	
	Nombre	%	Nombre	%	Nombre	%			
74	387	65	71	171	61	216	125	3	353
23	193	32	28	68	35	125	1	3	100
3	6	1	1	3	1	3	3	9	242
-	9	2	-	-	3	-	3	-	100
100	595	100	100	100	100	100	100	100	100

*Selon les données de 1981-83

* Pourcentages fondés sur 579 accidents dont on connaissait l'heure.

PARTIE 4

ACCIDENTS AUX PASSAGES À NIVEAU

4.1 NOMBRE D'ACCIDENTS AUX PASSAGES À NIVEAU PAR COMPAGNIE FERROVIAIRE (Relevé pour 1984)

Toutes les compagnies ferroviaires	CN	CP	Autres	Total %
Protégé par des signaux automatiques, etc.	157	116	15	288
Non-protégé	164	102	9	275
De ferme	5	1	-	6
Privé	17	8	1	26
TOTAL	343	227	25	595

Accidents aux passages à niveau par sorte de passage à niveau

Protégé par des signaux

automatiques, etc.

Non-protégé

De ferme

Privé

Accidents aux passages à niveau par province

T.-N.	2	-	-	2
I.P.-E.	5	-	-	5
N.-E.	9	6	2	17
N.-B.	8	8	-	16
Qué.	13	28	1	122
Ont.	112	66	15	193
Man.	18	25	-	43
Sask.	33	28	-	61
Alb.	44	46	-	90
C.-B.	19	20	7	46
Yukon	-	-	-	-
T.N.-O.	-	-	-	-
TOTAL	343	227	25	595

Accidents aux passages à niveau selon la saison

Jan.-fév et déc.

Mars-nov.

119	76	6	201	34
224	151	19	394	66
343	227	25	595	100

TOTAL

1982-84
NOMBRE TOTAL D'ACCIDENTS AUX PASSAGES A
NIVEAU ET CEUX CAUSANT DES VICTIMES

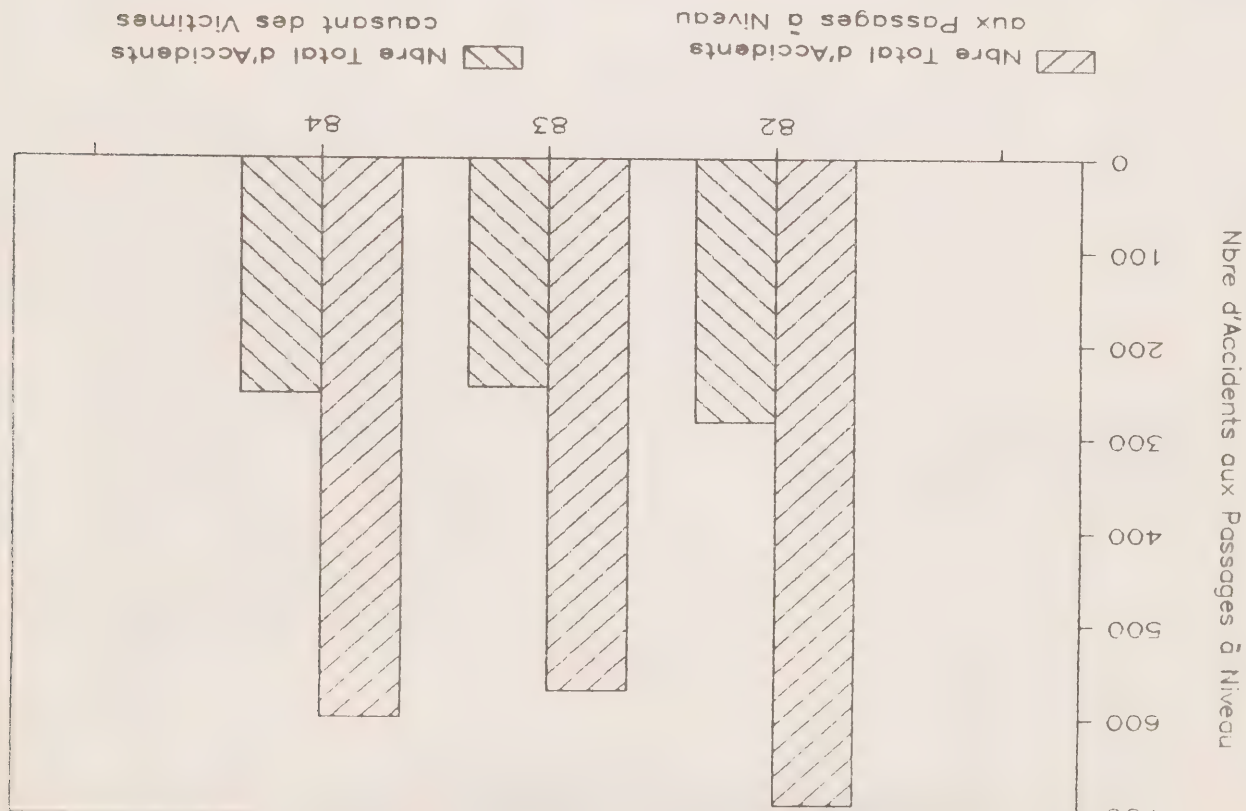


Fig 4 7

DISTRIBUTION STATISTIQUE DES DECES
ET DES ACCIDENTS AUX PASSAGES A NIVEAU METTANT EN CAUSE CES DECES

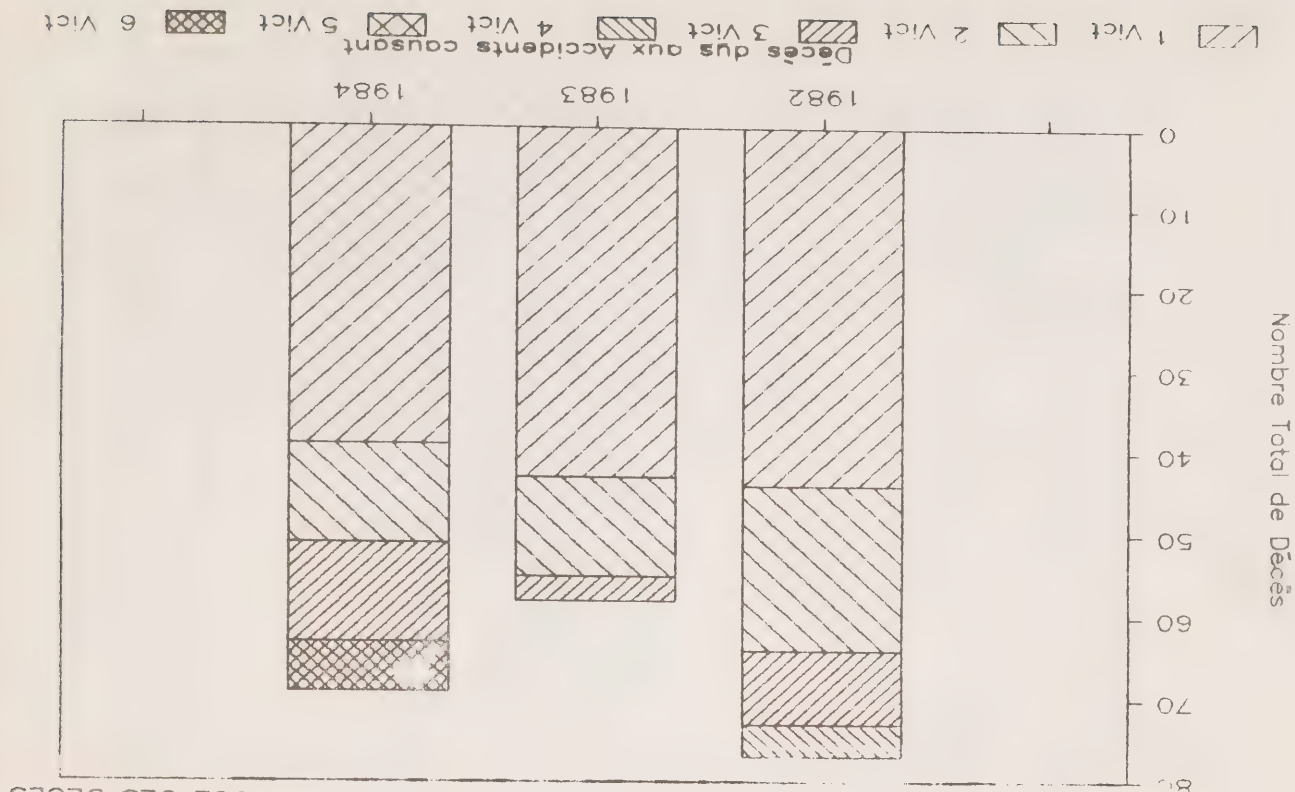
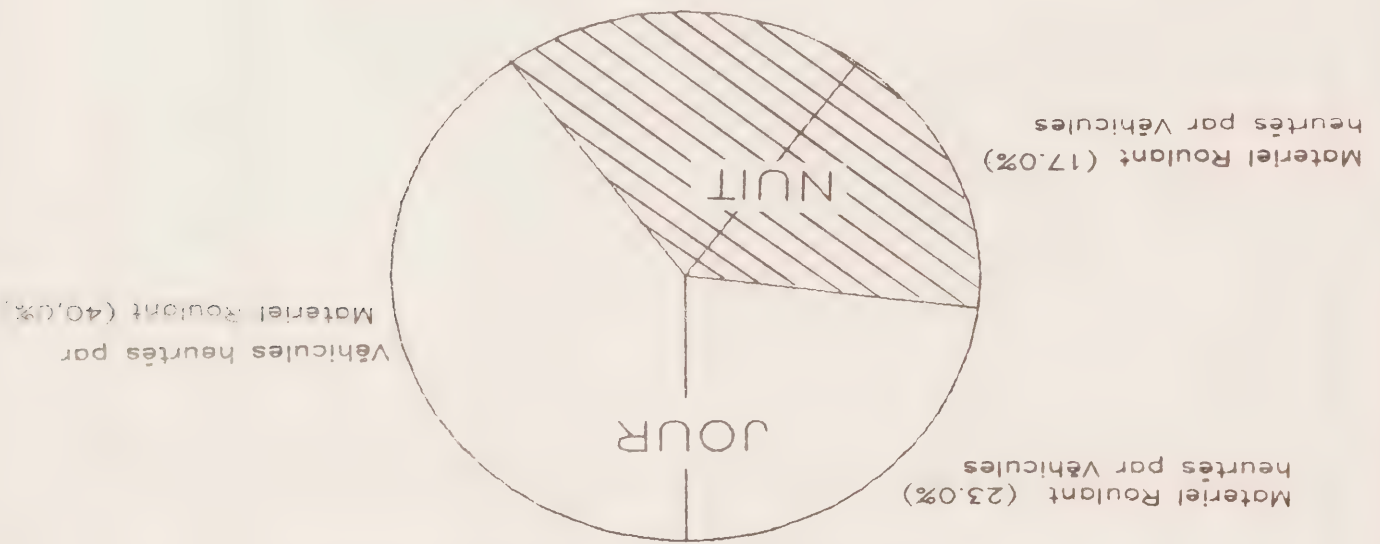


Fig.4.8

ACCIDENTS AUX PASSAGES À NIVEAU PAR SORTE D'IMPACT 1984

- 49 -



Véhicules heurtés par (20.0%)
Matériel Roulant
579
↓
579
↑
Nombre Total d'Accidents aux Passages à Niveau dont on connaissait l'heure

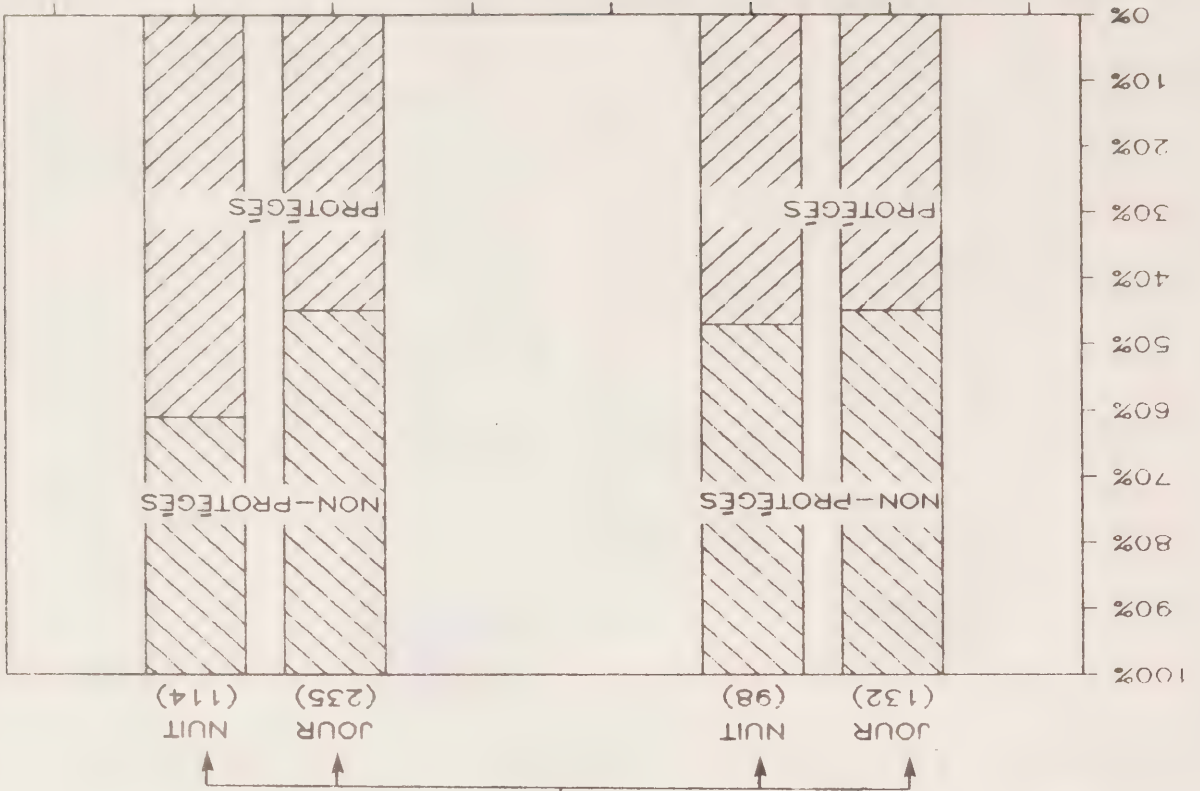


Fig.4.6.

Véhicules heurtés par Véhicules
Matériel Roulant heurté par Véhicules

Moyenne du Nombre d'Accidents
aux Passages à Niveau

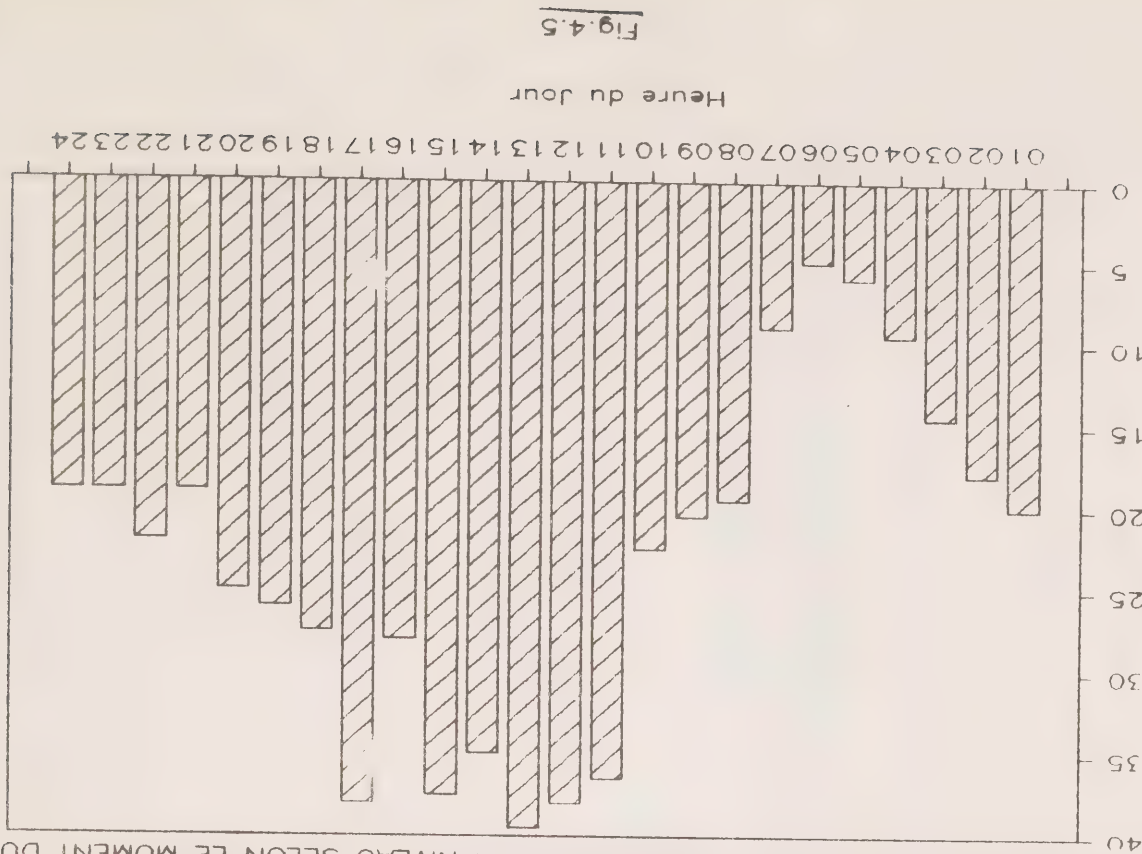


Fig.4.5

Nbre d'Accidents aux Passages à Niveau

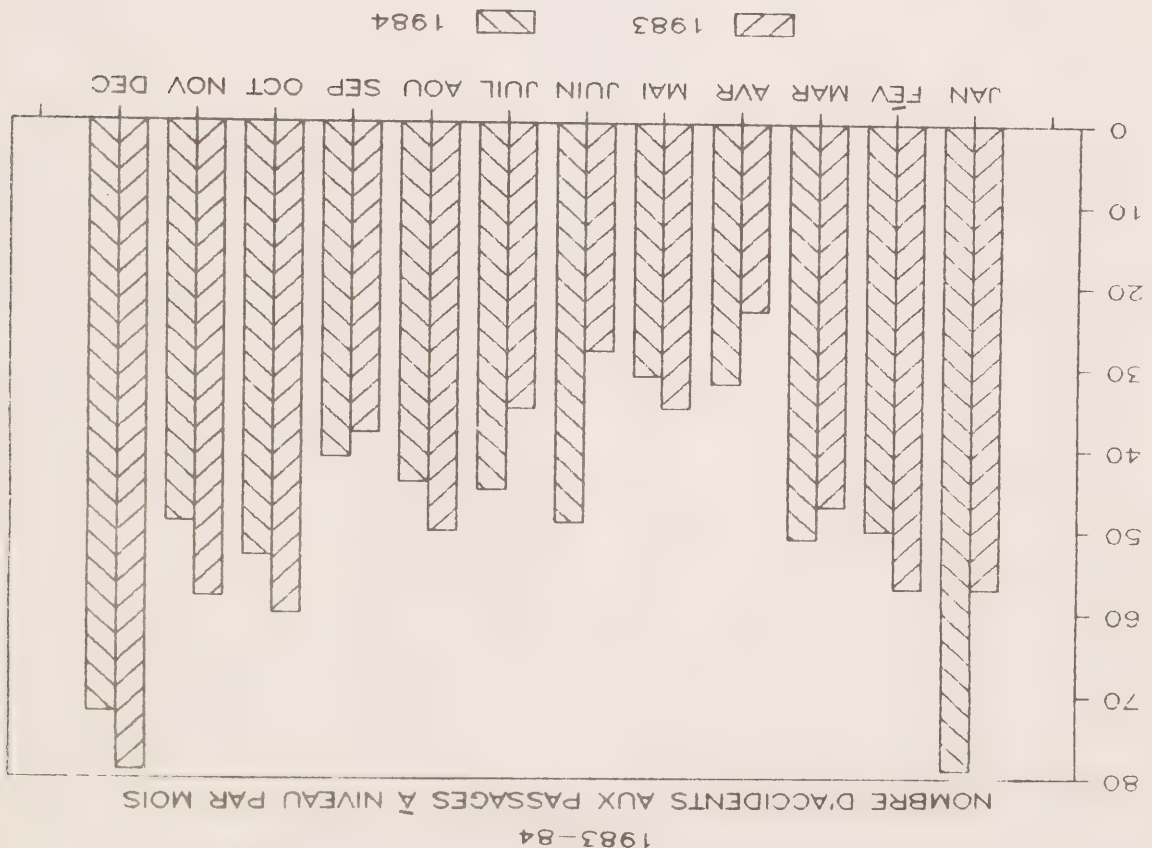
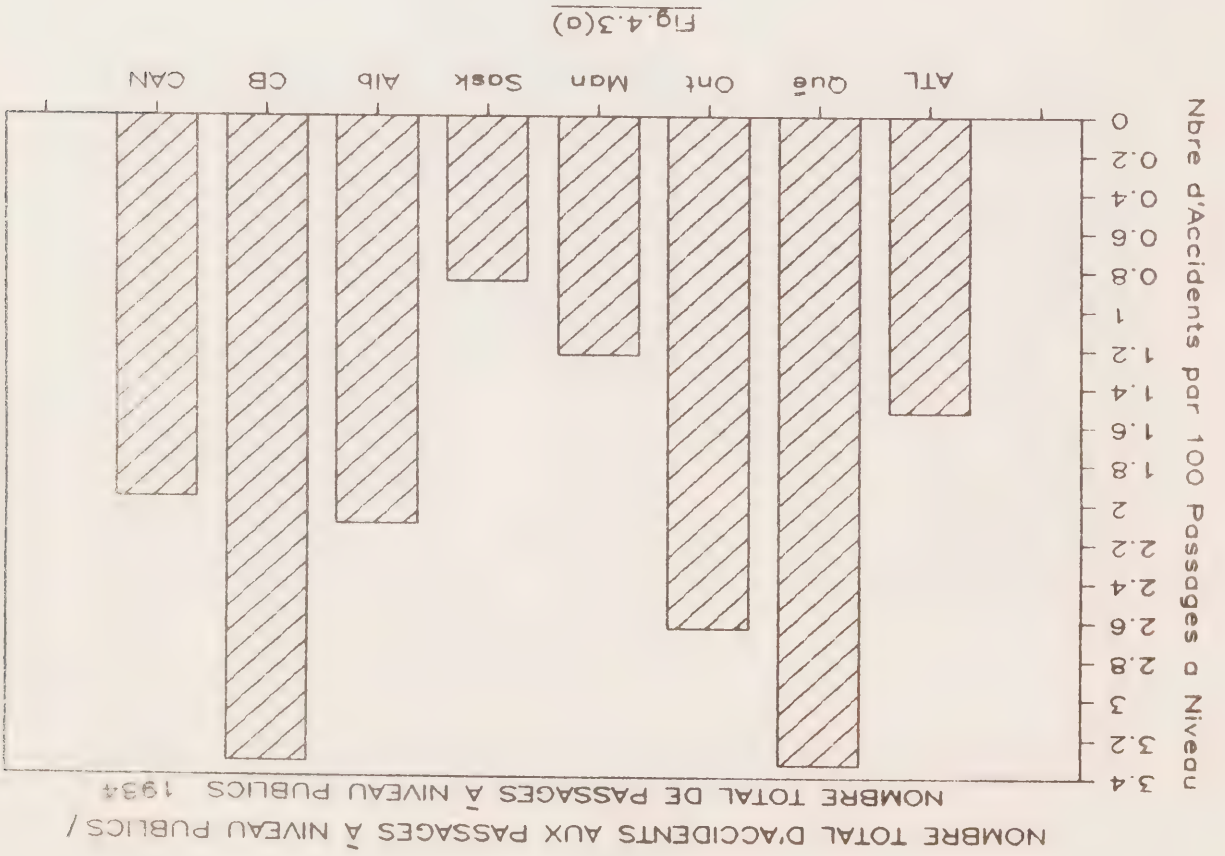
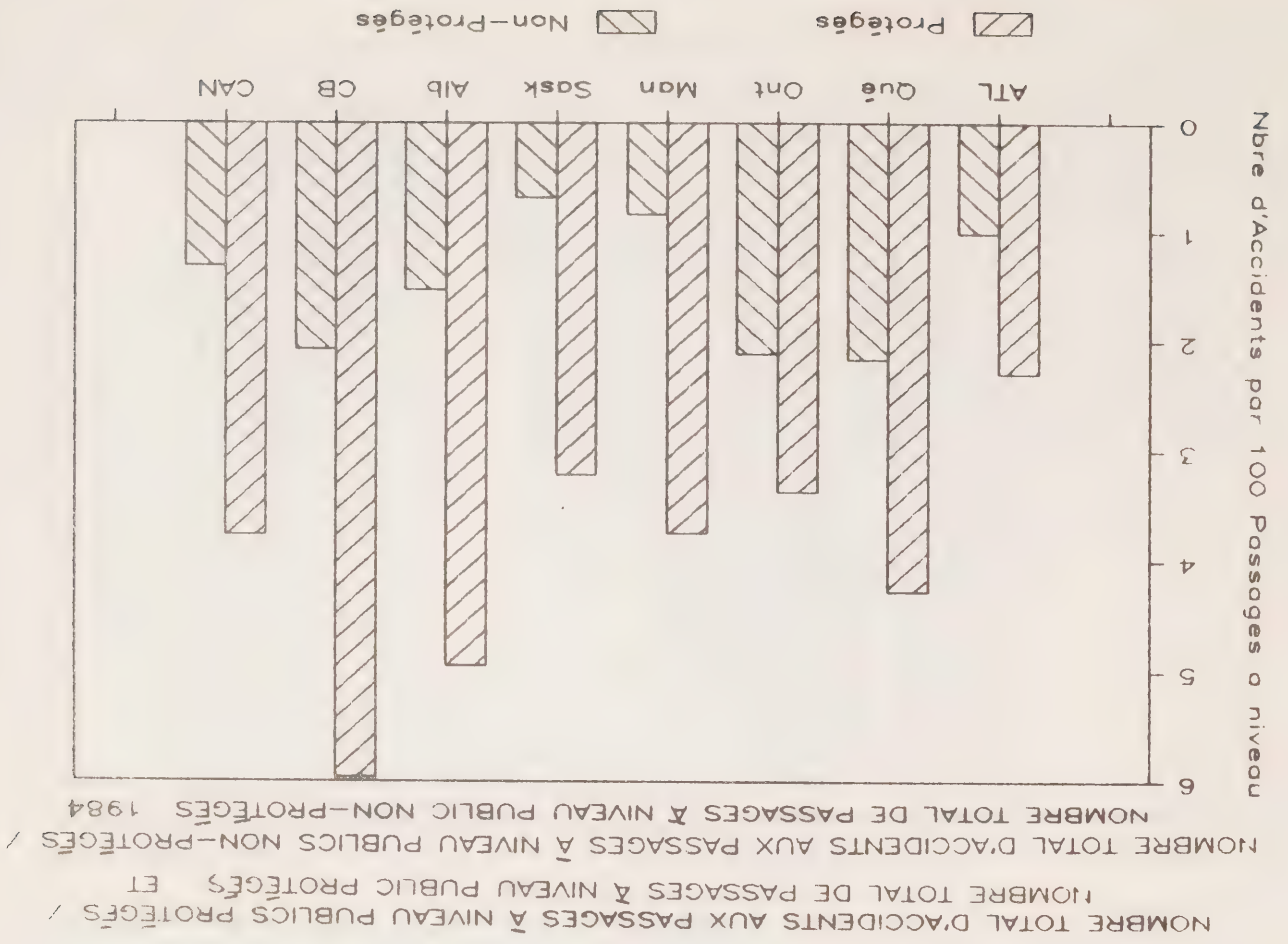
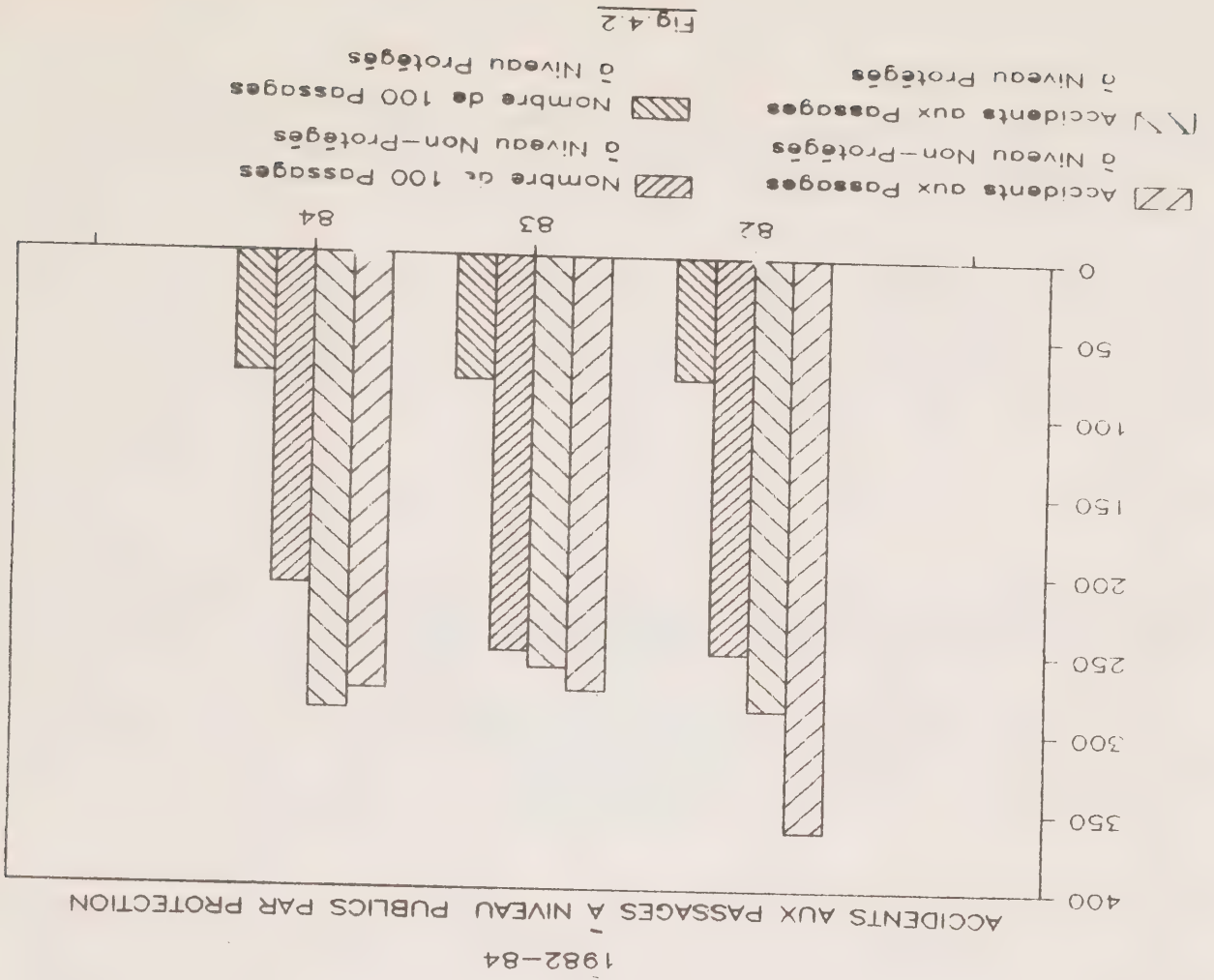
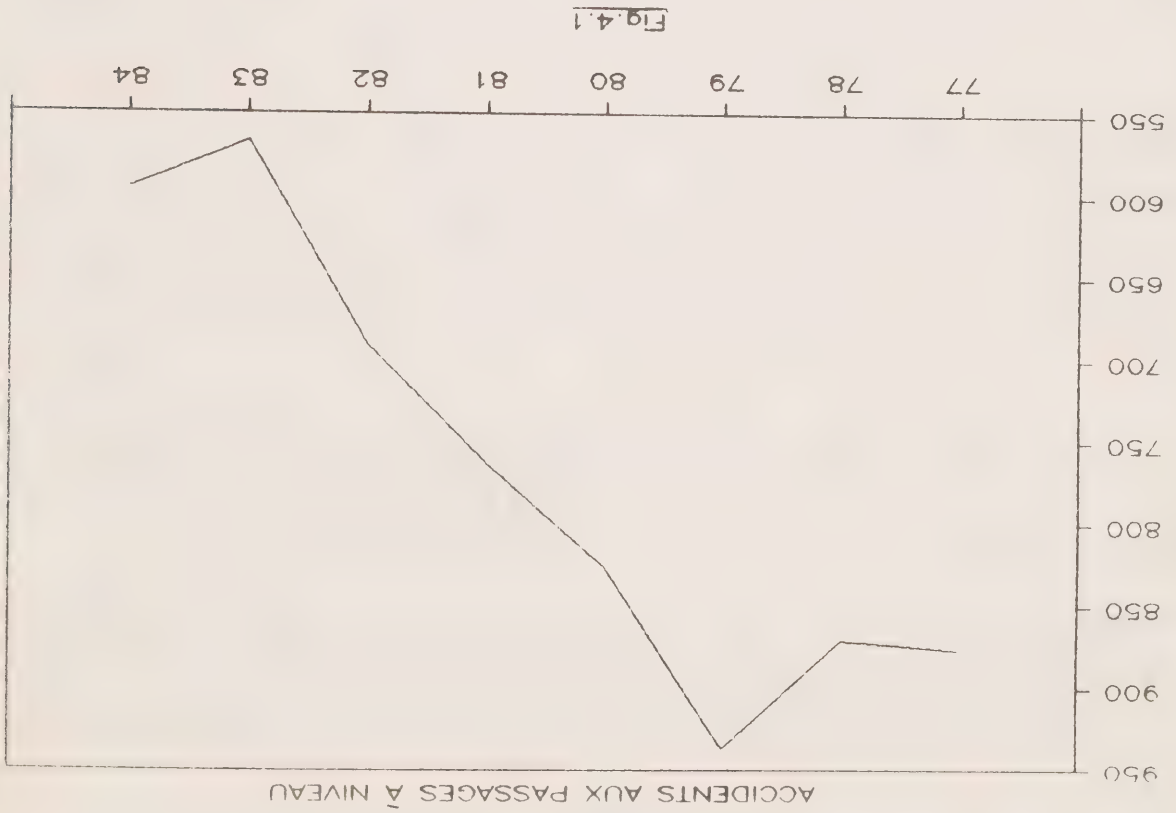


Fig.4.4





cause des marchandises dangereuses ne représentent jamais plus de 2 p. 100 du nombre total des accidents aux passages à niveau devant faire l'objet de rapports. En général les accidents aux passages à niveau n'entraînent pas un déraillement. Onze tels cas ont été enregistrés en 1984 comparativement à 18 en 1983.

Il y a eu 40 accidents aux passages à niveau par million de véhicules à moteur immatriculés en 1984, comparativement à 39 l'année précédente. Le taux d'accidents aux passages à niveau par million de trains-milles s'élevait à 7,17 en 1984 comparativement à 7,46 en 1983.

Victimes

Il est intéressant de noter que la majorité des accidents aux passages à niveau ne font pas de victimes (figure 4.7). En 1984, 34 p. 100 de tous les accidents aux passages à niveau ont entraîné des blessures mais seulement 8 p. 100 ont fait des décès. Par ailleurs, 50 accidents mortels à des passages à niveau ont fait 69 décès. En 1983, on avait déploré le même nombre mortels, mais seulement 58 décès. La figure 4.8 montre la distribution statistique des décès et des accidents aux passages à niveau mettant en cause ces décès. Par exemple, en 1984 on a enregistré 39 accidents où une personne a perdu la vie, six accidents qui ont fait deux morts chacun, quatre accidents avec trois morts et un accident avec six morts (ce dernier s'est produit le 30 mars 1984 à Milton en Ontario lorsqu'une voiture est allée percuter contre un train; six personnes ont été tuées et un blessée). En 1984, le nombre de décès a augmenté de quelque 19 p. 100 mais, comme nous venons de le mentionner, c'était essentiellement à cause des accidents qui ont fait plusieurs décès à la fois.

Bien que les accidents aux passages à niveau soient à l'origine de la plupart des décès reliés aux chemins de fer, les personnes qui y perdent la vie ne sont pas des passagers ou des employés des compagnies ferroviaires. En 1984, 96 p. 100 des victimes étaient des occupants de véhicules à moteur; les autres étaient essentiellement des employés, des entrepreneurs ou des piétons. En outre, 88 p. 100 des blessés aux passages à niveau étaient des occupants de véhicules à moteur. Au total, 292 personnes ont été blessées en 1984 dans des accidents aux passages à niveau, soit un peu plus que les 286 personnes blessées en 1983.

La figure 4.4 montre les fluctuations des accidents aux passages à niveau selon le moment de l'année. Comme il faut s'y attendre, l'hiver est la période la plus critique à cause des conditions imprévisibles des routes. En 1984 à peine plus du tiers de tous les accidents à des passages à niveau ont été enregistrés durant les mois de janvier, février et décembre. En outre, la graphique des accidents montre légèrement à certains mois d'été et d'automne probablement à cause du volume accru de vacanciers sur les routes.

Deux sur trois accidents aux passages à niveau se produisent le jour. Le graphique de la figure 4.3 implique que la probabilité d'accidents aux passages à niveau est plus élevée en milieu de journée à cause de la plus forte densité de circulation. Les accidents semblent se raréfier en milieu d'après-midi, après quoi les heures de pointe après le travail sont la raison d'un autre haut sommet d'accidents aux passages à niveau. Chose intéressante, les heures de pointe du matin ne sont pas critiques probablement parce que les automobilistes sont plus attentifs. Les accidents qui surviennent pendant la nuit peuvent être attribuables à divers facteurs tels la fatigue et la consommation d'alcool. Pendant ces heures, le graphique est assez stable sauf qu'elle augmente légèrement à une heure du matin au moment où les commerces de nuit ferment leurs portes. Le nombre d'accidents ensuite retombe drastiquement jusqu'aux heures du matin.

Pour tous les trois accidents aux passages à niveau où un train heurte un véhicule, on compte deux accidents où un véhicule va percuter contre un train. Le graphique de la figure 4.6 montre la répartition des accidents survenus aux passages à niveau par sorte d'impact. Il donne tout d'abord en pourcentage le nombre de collisions qui se sont produites le jour et la nuit et le divise ensuite en deux catégories, soit les accidents aux passages à niveau protégés et les accidents aux passages non protégés. Examinons, par exemple les accidents aux passages à niveau où un train heurte un véhicule. Le graphique révèle que durant le jour le nombre d'accidents aux passages à niveau protégés et celui aux passages à niveau non protégés est à peu près le même. Il est cependant intéressant de noter que durant la nuit la proportion d'accidents aux passages à niveau protégés est beaucoup plus élevée.

De tous les accidents enregistrés aux passages à niveau, 86 p. 100 mettaient en cause des trains de marchandises et 11 p. 100 des trains de voyageurs. Dans les autres cas, il s'agissait de draines et d'équipements d'entretien de la voie. Le tableau 4.2 donne un aperçu des accidents aux passages à niveau par type de véhicule. Près du quart de tous les véhicules moteur immatriculés sont des camions et des autobus (74 p. 100 étant des véhicules à passagers), et pourtant, presque un tiers de tous les accidents aux passages à niveau mettaient en cause des camions. Le tableau révèle également que le pourcentage de ces accidents était encore plus élevé si l'on tenait compte uniquement des cas où un train a heurté un véhicule. Les chiffres pourraient donc laisser sous-entendre que les conducteurs de camion prennent peut-être plus de risques aux passages à niveau que ceux qui conduisent des véhicules à passagers, surtout lorsqu'aucun matériel roulant ne se trouve sur le passage.

Il est beaucoup moins probable qu'un accident à un passage à niveau mette en cause des marchandises dangereuses qu'un déraillement ou une collision. Depuis des années, les accidents aux passages à niveau mettaient en

ACCIDENTS AUX PASSAGES À NIVEAU

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Il y a accident à un passage à niveau lorsqu'il y a collision entre du matériel roulant acheminé sur la voie et un usager d'un passage à niveau public, privé ou de ferme, et que cette collision cause des dommages ou fait des victimes. Tous les accidents aux passages à niveau publics doivent faire l'objet d'un rapport, mais ceux qui surviennent à des passages privés ou de ferme ne doivent être signalés que s'ils font des victimes.

En 1984, on a signalé 595 accidents aux passages à niveau, ce qui représente une augmentation de 4,9 p. 100 comparativement à 1983. Le rapport entre les accidents et les travaux accomplis a toutefois diminué puisque le nombre de trains-milles ferroviaires a augmenté de presque 11 p. 100 au cours de cette même période. La figure 4.1 montre que le nombre total d'accidents aux passages à niveau a diminué progressivement entre 1979 et 1983. La majorité des accidents aux passages à niveau qui ont fait l'objet de rapports se sont produits à des passages à niveau publics. En 1984, on a enregistré 563 tels accidents dont le nombre d'accidents aux passages à niveau protégés est légèrement plus élevé que celui des passages à niveau publics non protégés. Ceci est en contraste avec le nombre actuel de passages à niveau publics au Canada; en 1984 le nombre de passages à niveau non protégés a surpassé de 3 fois le nombre de passages à niveau protégés (figure 4.2). Le risque d'accidents est beaucoup plus élevé aux passages à niveau protégés car le trafic routier et ferroviaire y est beaucoup plus intense qu'aux passages à niveau non protégés.

Plus des deux des 563 accidents survenus aux passages à niveau publics en 1984 se sont produits en Ontario, au Québec et en Alberta. Il convient cependant de noter que ces provinces comptent presque la moitié des quelque 28 700 passages à niveau au Canada. La figure 4.3(a) donne pour chaque province le rapport entre le nombre d'accidents aux passages à niveau public et le nombre total de passages à niveau public qui s'y trouvent. Pour l'ensemble du Canada, on a enregistré environ deux accidents pour 100 passages à niveau. Au Québec, en Colombie-Britannique et en Ontario, le nombre d'accidents aux passages à niveau dépassait de beaucoup la moyenne nationale, tandis que les provinces de l'Atlantique et des Prairies, les statistiques étaient égales ou inférieures à la moyenne du Canada.

Environ 75 p. 100 des passages à niveau publics au Canada sont non protégés. La figure 4.3(b) démontre le rapport d'accidents aux passages à niveau publics à l'égard des passages protégés et non protégés; pour chaque 100 passages à niveau au Canada, 3,8 accidents se produisent à des passages publics protégés et 1,3 à des passages non protégés. Il faut cependant noter que les passages à niveau non protégés ne sont pas aussi fréquentes que les passages protégés. Si l'on examine les rapports entre les accidents et les passages à niveau protégés, pour en connaître davantage au chapitre de la sécurité, on constate que l'Ontario a déploré le plus grand nombre d'accidents à ces passages en 1984, mais qu'elle a affiché un meilleur record que le Québec et toutes les provinces de l'Ouest sauf la Saskatchewan.

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3.8 DÉRAILLEMENTS ET VICTIMES PAR PROVINCE (1983-84)

1983				1984			
Accidents	Morts	Blessés		Accidents	Morts	Blessés	
10	-	-	T.-N.	7	-	-	-
8	-	-	I.P.-E.	-	-	-	-
14	-	-	N.-E.	6	-	-	-
33	-	-	N.-B.	15	-	-	-
80	-	-	Qué.	38	-	-	2
17	-	-	Ont.	67	-	-	3
12	-	-	Man.	11	-	-	3
46	-	-	Sask.	26	-	-	5
33	-	-	Alb.	40	1	8	6
-	-	-	C.-B.	69	-	-	-
1	-	-	Yukon	-	-	-	-
254	-	42	Canada	279	1	27	

3.7 Déraillements par le nombre de wagons et/ou locomotives dérailles 1983-84

1983		1984	
Déraillements		Déraillements	
Trains directs	Mouvements de triage	Trains directs	Mouvements de triage
1	25	83	22
2	17	33	13
3	5	18	3
4	2	14	3
5	-	12	3
6	-	9	-
7	-	9	-
8	-	9	-
9	-	9	-
10	-	4	-
11-15	-	4	1
Plus de 15	1	16	-
Total	19	22	-
	202	233	46

NOMBRE DE DERAILLEMENTS DE TRAINS DIRECTS PAR BILLIARD DE TONNES-MILES
DE MARCHANDISES BRUTES (MARCHANDISES BTMB) (1977-1984)

	1977	1978	1979	1980	1981	1982	1983	1984
<u>CN</u>								
Nombre total de déraillements	190	188	239	209	236	196	169	170
Déraillements de train direct	180	181	232	186	204	176	139	142
Marchandises								
B.T.M.B.	140,9	147,2	155,4	161,0	159,3	139,6	157,7	174,7
Déraillements de train direct par								
Marchandises								
B.T.M.B.	1,28	1,23	1,49	1,16	1,28	1,26	0,88	0,81
<u>CP</u>								
Nombre total de déraillements	105	86	92	72	95	111	64	88
Déraillements de train direct	99	84	90	70	82	89	55	78
Marchandises								
B.T.M.B.	104,7	110,8	114,7	114,0	119,3	112,8	119,6	127,9
Déraillements de train direct par								
Marchandises								
B.T.M.B.	0,95	0,76	0,78	0,61	0,69	0,79	0,46	0,61
<u>Autres</u>								
Nombre total de déraillements	17	21	8	11	17	20	21	21
Déraillements de train direct	16	20	6	9	11	8	8	13
Marchandises								
B.T.M.B.	36,5	27,3	37,8	33,5	30,6	23,1	21,3	27,1*
Déraillements de train direct par								
Marchandises								
B.T.M.B.	0,44	0,73	0,16	0,27	0,36	0,35	0,38	0,48*
<u>Toutes les compagnies</u>								
<u>Ferroviaires</u>								
Nombre total de déraillements	312	295	339	292	348	327	254	279
Déraillements de train direct	295	285	328	265	297	273	202	233
Marchandises								
B.T.M.B.	282,1	285,2	307,9	308,5	309,2	275,6	298,5	329,7*
Déraillements de train direct par								
Marchandises								
B.T.M.B.	1,05	1,00	1,07	0,86	0,96	0,99	0,68	0,71*
<u>Approximatif</u>								

3.5 NOMBRE DE VICTIMES DES DÉRAILLEMENTS (1977-1984)

	1977	1978	1979	1980	1981	1982	1983	1984
Morts								
CN	1	2	-	-	-	-	-	-
CP	-	-	1	-	-	-	-	1
Autres	-	-	-	-	-	-	-	-
Toutes les compagnies ferroviaires	1	2	1	-	-	-	-	1
Blessés								
CN	37	25	40	77	83	46	31	14
CP	14	2	33	25	8	49	4	13
Autres	-	4	-	1	1	-	7	-
Toutes les compagnies ferroviaires	51	31	73	103	92	95	42	27

3.4 NOMBRE DE DÉRAILLEMENTS (1977-1984)

	1977	1978	1979	1980	1981	1982	1983	1984
CN								
Trains directs	180	181	232	186	204	176	139	142
Mouvements de								
triage	10	7	7	23	32	20	30	28
TOTAL	190	188	239	209	236	196	169	170
CP								
Trains directs	99	84	90	70	82	89	55	78
Mouvements de								
triage	6	2	2	2	13	22	9	10
TOTAL	105	86	92	72	95	111	64	88
Autres								
Trains directs	16	20	6	9	11	8	8	13
Mouvements de								
triage	1	1	2	2	6	12	13	8
TOTAL	17	21	8	11	17	20	21	21
Toutes les compagnies ferroviaires								
Trains directs	295	285	328	265	297	273	202	233
Mouvements de								
triage	17	10	11	27	51	54	52	46
TOTAL	312	295	339	292	348	327	254	279

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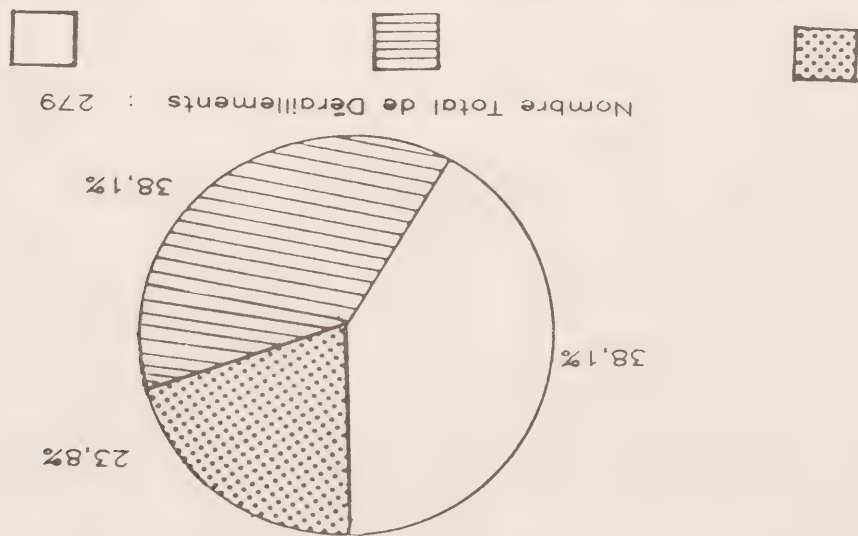
3.2 NOMBRE DE VICTIMES DES DÉRAILLEMENTS (Relève pour 1983 et 1984)

MORTS		BLESSÉS		Toutes les compagnies ferroviaires		TOTAL	
Employés	Passagers	CN	CP	Autres	CN	CP	Autres
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	17	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	1	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	42	27
1	1	-	-	-	-	7	0
-	-	-	-	-	-	13	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	14	14
1	1	-	-	-	-	4	13
-	-	-	-	-	-	7	0
1983	1984	1983	1984	1983	1984	1983	1984
1	1	-	-	-	-	31	

Tous les déraillements		Déraillements avec des m.d.	
1983	1984	1983	1984
CN			
Trains directs	139	28	29
Mouvements de triage	30	29	24
TOTAL	169	57	53
CP			
Trains directs	55	78	15
Mouvements de triage	9	10	8
TOTAL	64	88	36
Autres			
Trains directs	8	13	2
Mouvements de triage	13	8	12
TOTAL	21	21	14
Toutes les compagnies ferroviaires			
Trains direct	202	233	45
Mouvements de triage	52	46	49
Total	254	279	94
Variation en %			
Trains directs	15,3	0,8	94
Mouvements de triage	-11,5	0,8	41
TOTAL	-16,3	6,4	100

NOMBRE DE DÉRAILLEMENTS PAR CAUSE

Nombre Total de Dérailllements : 279



Equipements Défectueux Erreurs d'Exploitation Mauvais état de la voie

Fig. 3.3

1982-1984

NBRE DE DÉRAILLEMENTS PAR CAUSE ÉTABLIE

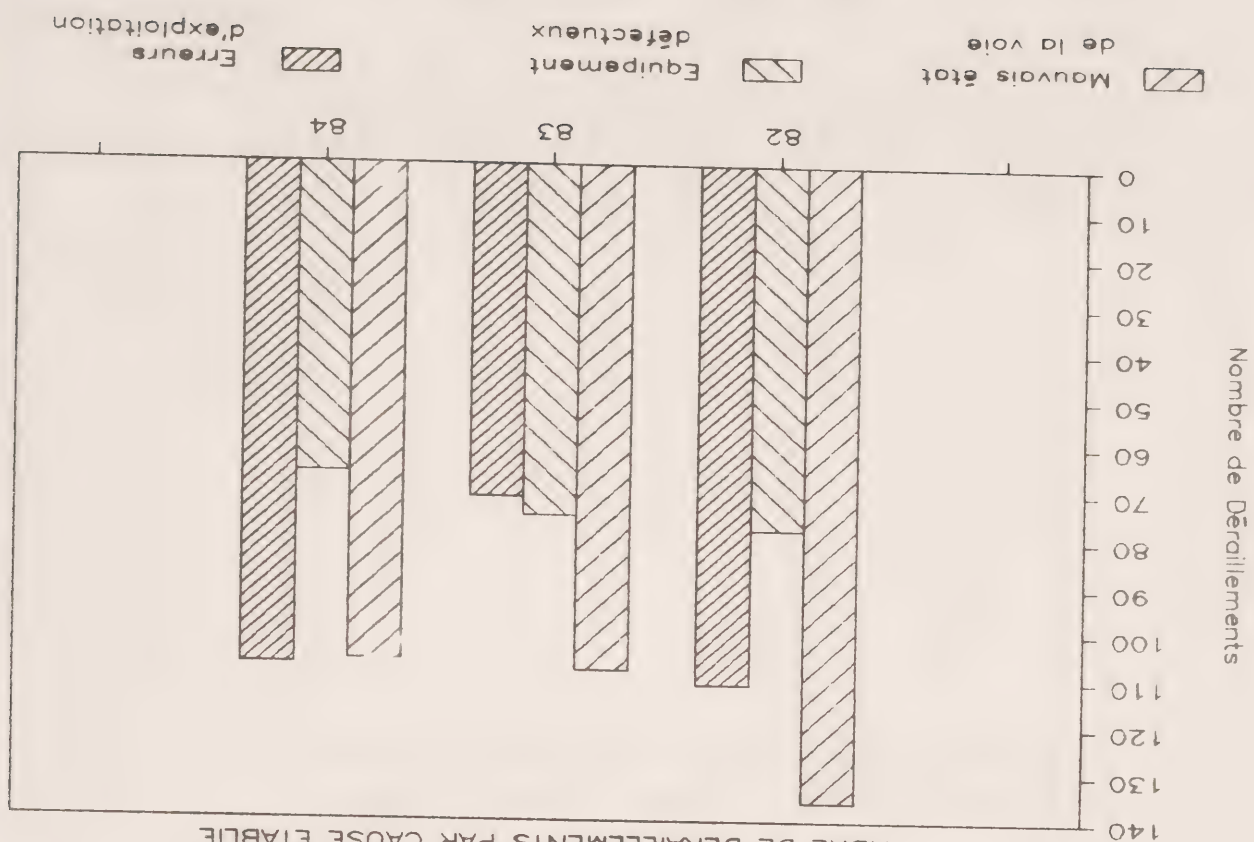
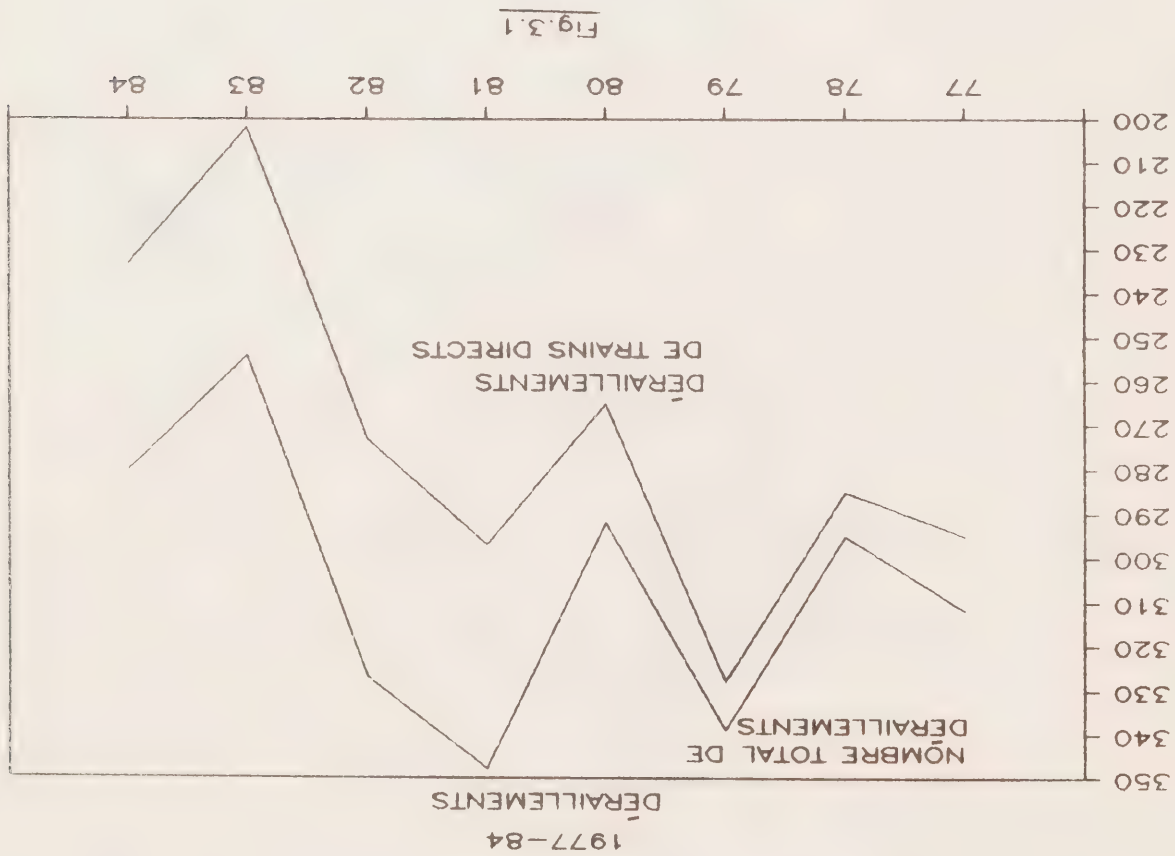
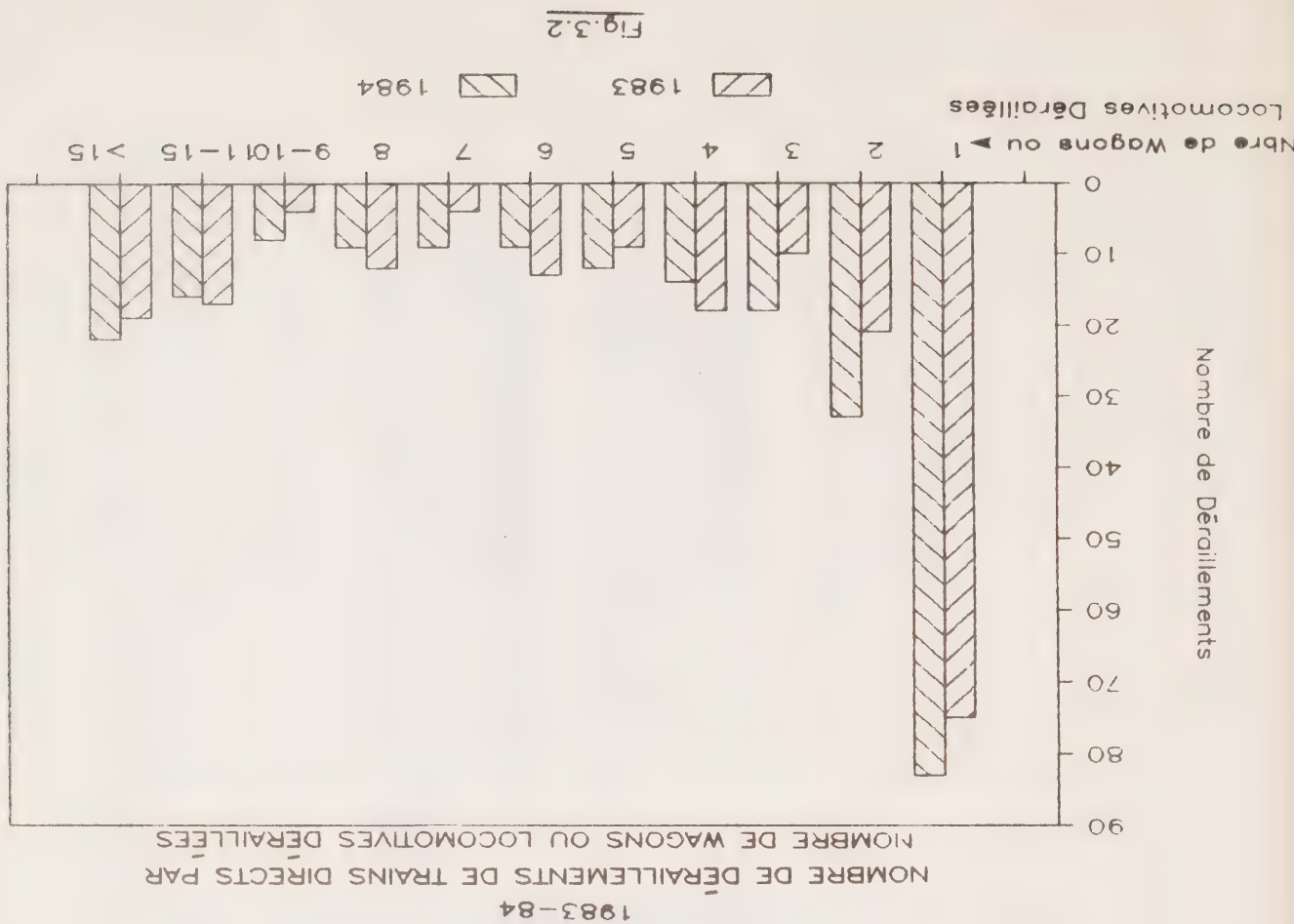


Fig. 3.4

Nombre de Déraillements



Nombre de Déraillements



En règle générale, les déraillements ne font pas beaucoup de victimes. Depuis cinq ans, une seule personne est morte à la suite d'un déraillement de train (en 1984). Le nombre de blessés est tombé de 42 à 27 en 1984, ce qui représente une baisse de 36 p. 100 par rapport à l'année précédente.

PARTIE 3

DÉRAILLEMENTS DE TRAIN

(Impliquant des trains en déplacement seulement)

Accidents

Le déraillement d'un train survient lorsqu'un train, une locomotive ou un wagon sort des rails. Les critères régissant la présentation des rapports sont les mêmes que pour les collisions: tout déraillement qui survient sur une voie principale et qui entraîne des dommages matériels de plus de 750 \$ (ou sur toute autre voie s'il met en cause des marchandises dangereuses ou fait des victimes) doit faire l'objet d'un rapport. Cependant, contrairement aux collisions, la plupart des déraillements qui font l'objet de rapports ont lieu sur des voies principales plutôt que dans les gares de triage (figure 3.1).

En 1984, il y a eu en tout 279 déraillements, soit 9,8 p. 100 de plus qu'en 1983. En termes de tonnes-milles brutes, le trafic ferroviaire a augmenté de quelque 10,5 p. 100 pendant la même période. Plus de 80 p. 100 de ces déraillements sont survenus sur des voies principales; il s'agit d'une augmentation de 15,3 p. 100 par rapport à l'année précédente. Le nombre de déraillements dans les gares de triage a diminué de 11,5 p. 100. Des 233 déraillements de trains directs recensés en 1984, sept mettaient en cause des trains de voyageurs alors qu'en 1983, on en comptait 6 sur 202. Plus du tiers de tous les déraillements survenus en 1984 mettaient en cause des wagons contenant des marchandises dangereuses (M.D.); le nombre total de cas visant des acheminements de M.D. a augmenté de 6,4 p. 100 au cours de l'année. De tous ces accidents, 41 p. 100 se sont produits dans les gares de triage. Le nombre de déraillements sur les voies principales par milliard de tonnes-milles brutes de marchandises se chiffrait à 0,71 en 1984 comparativement à 0,68 en 1983.

La figure 3.2 donne un aperçu des déraillements de trains directs suivant le nombre de wagons ou de locomotives dérailés. Près de 50 p. 100 des accidents de trains directs entraînent le déraillement de seulement un ou deux wagons/locomotives. C'est également le cas pour près des trois quarts des déraillements qui se produisent aux gares de triage (tableau 3.7). En 1984, les accidents qui ont occasionné le déraillement de plus de 10 wagons représentaient 14 p. 100 de tous les déraillements ferroviaires.

Près d'un quart de tous les déraillements survenus en 1984 ont été causés par de l'équipement défectueux. Quant aux autres (76 p. 100), ils étaient attribuables soit au mauvais état de la voie (ou aux conditions atmosphériques) soit aux activités d'exploitation (figure 3.3). Depuis quelques années, on voit de moins en moins de déraillements causés par des défectuosités de la voie ou de l'équipement, grâce aux améliorations apportées à l'entretien et à l'équipement (figure 3.4). Quant aux déraillements liés aux activités d'exploitation, ils ont tendance à fluctuer d'une année à l'autre car une bonne partie d'entre eux résultent d'une violation des règles.

DÉRAILLEMENTS DE TRAIN

PARTIE 3

2.5 NOMBRE DE COLLISIONS ET VICTIMES PAR PROVINCE (1983-84)

1983			1984		
Accidents	Morts	Blessés	Accidents	Morts	Blessés
T.-N.	-	-	-	-	-
I.P.-E.	-	-	-	-	-
N.-E.	1	26	1	-	-
N.-B.	5	-	3	-	-
Qué.	10	66	17	-	11
Ont.	17	20	28	-	42
Man.	3	-	7	-	3
Sask.	4	2	2	-	-
Alb.	29	22	18	-	5
C.-B.	23	27	22	-	10
Yukon	-	-	-	-	-
T.N.-O.	-	-	1	-	-
Canada	92	163	99	-	71

2.4 NOMBRE DE COLLISIONS DE TRAIN DIRECT PAR MILLION DE TRAINS-MILES (MTM) (1977-1984)

1977 1978 1979 1980 1981 1982 1983 1984

Nombre total de collisions	MTM	Collisions de train direct*	Collisions de train direct par MTM
40	50.7	50.7	50.7
50	50.3	41.4	37.9
46			
47			
69	36.4	36.4	36.4
59	30.6	30.6	30.6
61	32.7	32.7	32.7
75	36.1	36.1	36.1
			.30

CN

Nombre total de collisions	MTM	Collisions de train direct*	Collisions de train direct par MTM
21	29.2	29.2	29.2
14	29.9	27.6	27.0
29			
44			
36	27.2	27.2	27.2
38	24.4	24.4	24.4
27	24.8	24.8	24.8
23	26.2	26.2	26.2
			.11

Autres

Nombre total de collisions	MTM	Collisions de train direct*	Collisions de train direct par MTM
2	10.3	10.3	10.3
2	10.5	22.6	24.4
5			
6			
3	22.3	22.3	22.3
4	18.9	18.9	18.9
4	18.5	18.5	18.5
1	20.7**	20.7**	20.7**
			.00

Toutes les compagnies ferroviaires

Nombre total de collisions	Collisions de train direct*	MTM	Collisions de train direct par MTM
63	90.3	90.3	90.3
66	90.4	91.6	89.2
80			
97			
108	85.8	85.8	85.8
101	73.9	73.9	73.9
92	76.0	76.0	76.0
99	83.0**	83.0**	83.0**
			.17**

Les données pour des collisions entre les trains directs ne sont pas disponibles pour les années précédentes

Approximatif

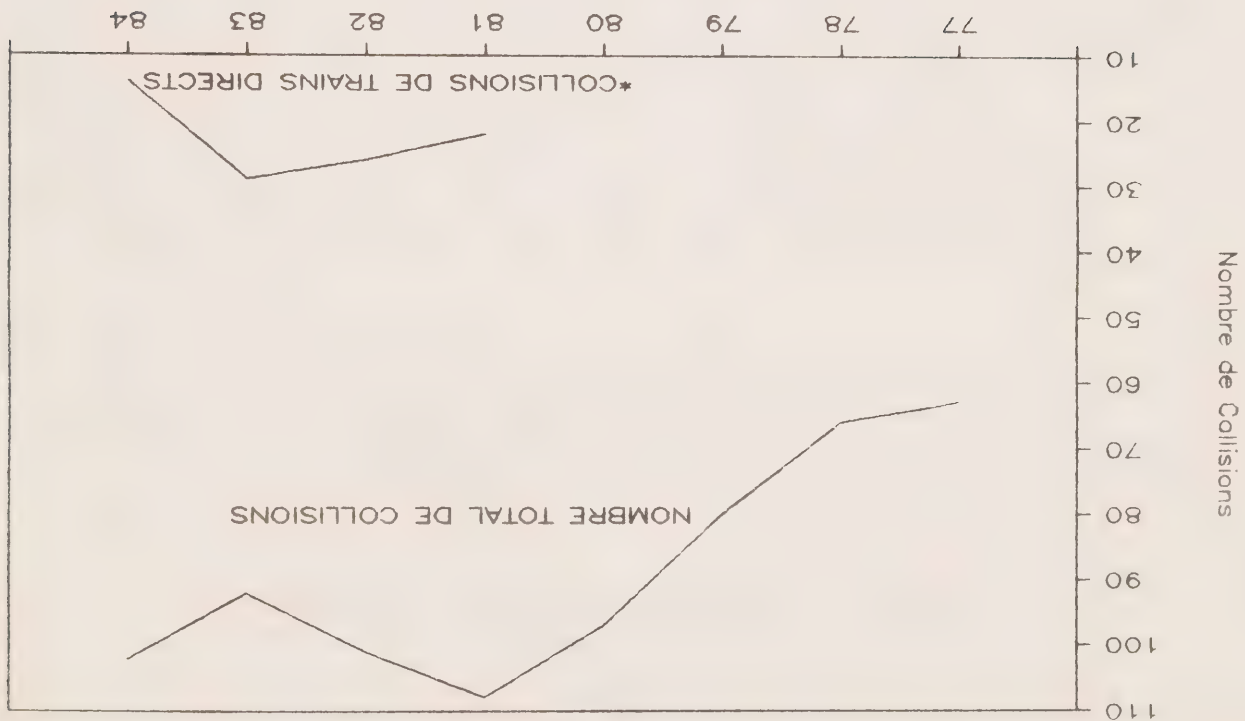
2.3 NOMBRE DE COLLISIONS ET VICTIMES (1977-1984)

Nombre de collisions		1977	1978	1979	1980	1981	1982	1983	1984
Toutes les compagnies ferroviaires		63	66	80	97	108	101	92	99
CN	40	50	46	47	69	59	61	75	
CP	21	14	29	44	36	38	27	23	
Autres	2	2	5	6	3	4	4	1	
Morts		-	-	1	-	3	-	2	-
CN	-	-	1	-	-	3	-	2	-
CP	1	-	2	1	-	-	-	5	-
Autres	-	-	-	-	-	-	-	-	-
Toutes les compagnies ferroviaires		1	-	3	1	3	-	7	-
Blessés		84	81	48	31	47	127	95	61
CN	4	-	15	21	19	16	34	10	61
CP	-	2	9	9	1	4	34	-	-
Autres	-	-	-	-	-	-	-	-	-
Toutes les compagnies ferroviaires		88	83	72	61	67	147	163	71
Toutes les compagnies ferroviaires		88	83	72	61	67	147	163	71

2.2 NOMBRE DE VICTIMES DES COLLISIONS (Relevé pour 1983 et 1984)

MORTS		BLESSES		Toutes les compagnies		Toutes les compagnies ferroviaires	
1983	1984	1983	1984	1983	1984	1983	1984
Passagers		Autres		Total		Total	
1983	1984	1983	1984	1983	1984	1983	1984
2	-	-	-	3	-	39	26
1	-	-	-	-	-	20	10
-	4	-	-	-	-	-	8
-	5	-	-	-	-	-	-
-	2	-	-	-	-	34	34
-	-	-	-	-	-	61	95
-	-	-	-	-	-	10	10
-	-	-	-	-	-	-	-

COLLISIONS
1977-84



* Les données pour les collisions de Trains
Directs ne sont pas disponibles avant 1980

Fig.2.1

PARTIE 2

COLLISIONS DE TRAIN

(Impliquant des trains en déplacement seulement)

Accidents

Une collision de train survient lorsqu'un train, une locomotive ou un wagon qui se déplace entre en contact avec un autre train, une autre locomotive ou un autre wagon. Toute collision sur une voie principale entraînant des dommages matériels de plus de 750 \$ (ou sur toute autre voie si elle met en cause des marchandises dangereuses ou si elle fait des victimes) doit faire l'objet d'un rapport.

En 1984, il y a eu 99 collisions de train, soit 7,6 p. 100 de plus qu'en 1983. De ces accidents, 86 p. 100 se sont produits au cours de manoeuvres d'aiguillage, ce qui représente une augmentation de quelque 35 p. 100 depuis 1983. Par ailleurs, les collisions metant en cause des trains directs ont diminué de presque la moitié figure (2.1); sur un total de 14 collisions, une seule metait en cause un train de voyageurs, comparativement à cinq en 1983. Deux tiers de toutes les collisions recensées en 1984 metaient en cause des wagons contenant des marchandises dangereuses (M.D.), ce qui représente une augmentation de 16,1 p. 100 par rapport à 1983. Près de 94 p. 100 des collisions liées aux M.D. sont survenues dans des gares de triage au cours de manoeuvres d'aiguillage. Des 99 collisions enregistrées en 1984, 39 ont occasionné un déraillement alors qu'en 1983, on en a compté 44 sur 92. La majorité de toutes collisions sont dues à l'erreur d'un employé, c'est-à-dire à une infraction aux règles et aux règlements d'exploitation. Les autres sont dues à des défauts mécaniques ou au vandalisme. Le nombre de collisions metant en cause des trains directs par million de trains-milles s'élève à 0,16 en 1984, comparativement à 0,38 en 1983.

Victimes

En 1984, on dénombrait 71 blessés, soit 56 p. 100 de moins qu'en 1983. De ce nombre, 28 sont le résultat de la collision impliquant un train de voyageur mentionnée précédemment qui s'est produite le 6 juin 1984 lorsqu'un train de voyageurs de VIA s'est engagé sur une aiguille mal dressée et a heurté des wagons plats immobilisés dans un chantier de scierie à Nepean (Ontario). Depuis 1977, les collisions n'ont fait que 15 morts, dont 7 en 1983; elles n'ont fait aucune victime en 1984.

COLLISIONS DE TRAIN

PARTIE 2

1.4 NOMBRE DE VICTIMES PAR TYPE DE PERSONNES (1977-1984)

	1977	1978	1979	1980	1981	1982	1983	1984
Morts								
Passagers	-	-	-	-	1	1	4	-
Employés	7	9	10	10	13	17	16	11
Autres	134	143	141	179	140	128	105	112
TOTAL	141	152	151	189	154	146	125	123
Blessés								
Passagers	324	420	400	334	636	667	534	431
Employés	2,754	2,909	3,358	3,137	3,189	2,962	2,658	2,716
Autres	403	437	453	428	412	337	319	329
TOTAL	3,481	3,766	4,211	3,899	4,237	3,966	3,511	3,476

BLESSES		Accidents de train		Collisions de train		Déraillements de train		Accidents aux passages à niveau		Collisions/ Déraillement de draisines/MEV*		Accidents relatifs au service de train		Incidents		Incendies		Incidents des marchandises dangereuses		Tous les autres incidents		TOTAL																																		
1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984																																	
Employés		Passagers		Autres		Total		85	46	78	25	-	-	163	71	22	27	20	-	-	42	27	30	18	5	9	251	265	286	292	74	57	587	464	-	-	65	61	652	525	1,848	2,096	431	397	3	2	2,282	2,995	2,658	2,716	534	431	319	329	3,511	3,476

* MEV: Machines d'entretien de la voie.

1.3 NOMBRE DE VICTIMES PAR SORTIE D'ACCIDENT/D'INCIDENT (Relevé pour 1983 et 1984)

	MORTS		Accidents de train		Collisions de train		Déraillements de train		Accidents aux passages à niveau		Collisions/ déraillements de draisines/MEV*		Accidents relatifs au service de train		Incidents		Incendies		Incident avec des marchandises dangereuses		Tous les autres incidents		TOTAL	
	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984
Employés	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Passagers	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Autres	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

*MEV: Machines d'entretien de la voie.

1.2 NOMBRE D'ACCIDENTS ET D'INCIDENTS (1977-1984)

	1977	1978	1979	1980	1981	1982	1983	1984
Accidents de train								
Collisions de train	63	66	80	97	108	101	92	99
Déraillements de train	312	295	339	292	348	327	254	279
Accidents aux passages à niveau	877	871	937	826	763	691	567	595
Collisions/ Déraillements de trains/ MEV*	73	72	68	81	69	61	53	45
TOTAL	1,325	1,304	1,424	1,296	1,288	1,180	966	1,018
Accidents relatifs au service de train	S/O	S/O	S/O	S/O	729	614	703	572
Incidents								
Incendies	450	240	246	229	221	273	254	231
M.D. (Fuites, etc.)	30	47	51	107	157	105	288	419
Tous autres incidents	S/O	S/O	S/O	S/O	2,886	2,811	2,383	2,560
TOTAL					3,764	3,189	2,925	3,210
Partie des accidents de train impliquant des marchandises dangereuses								
Collisions de train	7	14	17	44	65	67	56	65
Déraillements de train	36	43	42	65	132	101	94	100
Accidents aux passages à niveau	1	0	2	11	4	8	9	11

* MEV: Machines d'entretien de la voie.

** Comme les statistiques figurant dans le rapport de 1982 ne sont pas ventilées de la même façon que par les années passées, il est impossible de donner ici une série chronologique complète. Dans les rapports précédents, la plupart des données sur les victimes d'accidents relatifs au service de train figuraient sous la rubrique "blessures corporelles diverses".

PARTIE 1

RÉSUMÉ DES ÉVÉNEMENTS FERROVIAIRES

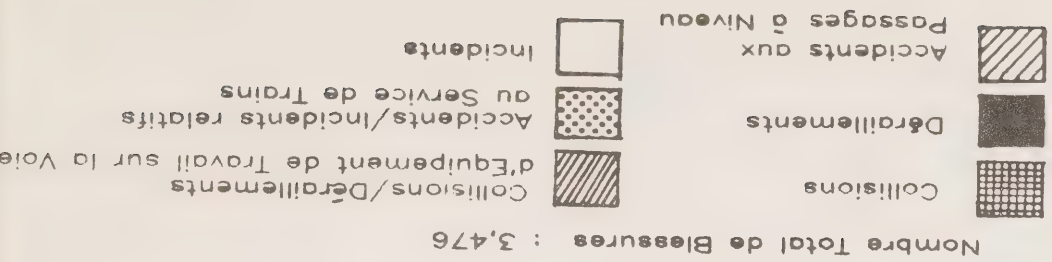
1.1 NOMBRE D'ACCIDENTS ET D'INCIDENTS (1983 et 1984)

Accidents/Incidents		Variation en %	
		1983	1984
<u>Accidents de train</u>			
Collisions de train	92	99	7,6
Déraillements de train	254	279	9,8
Accidents aux passages à niveau	567	595	4,9
Collisions/Déraillements du	53	45	-15,1
draisines/MEV*			
<u>Accidents relatifs au service de train*</u>			
TOTAL	966	1,018	5,4
Emploés frappés par du matériel roulant	35	38	8,6
Intrus frappés par du matériel roulant	111	101	-9,0
Emploés descendant de matériel roulant	557	433	-22,3
TOTAL	703	572	-18,6
<u>Incidents</u>			
Incendies	254	231	-9,1
Incidents des marchandises dangereuses	288	419**	45,5**
Tous les autres incidents	2,383	2,560	7,4
TOTAL	2,925	3,210	9,7

* MEV: Machines d'entretien de la voie.

** Cette augmentation est essentiellement attribuable aux exigences de rapport plus rigoureuses.

Fig.1.5

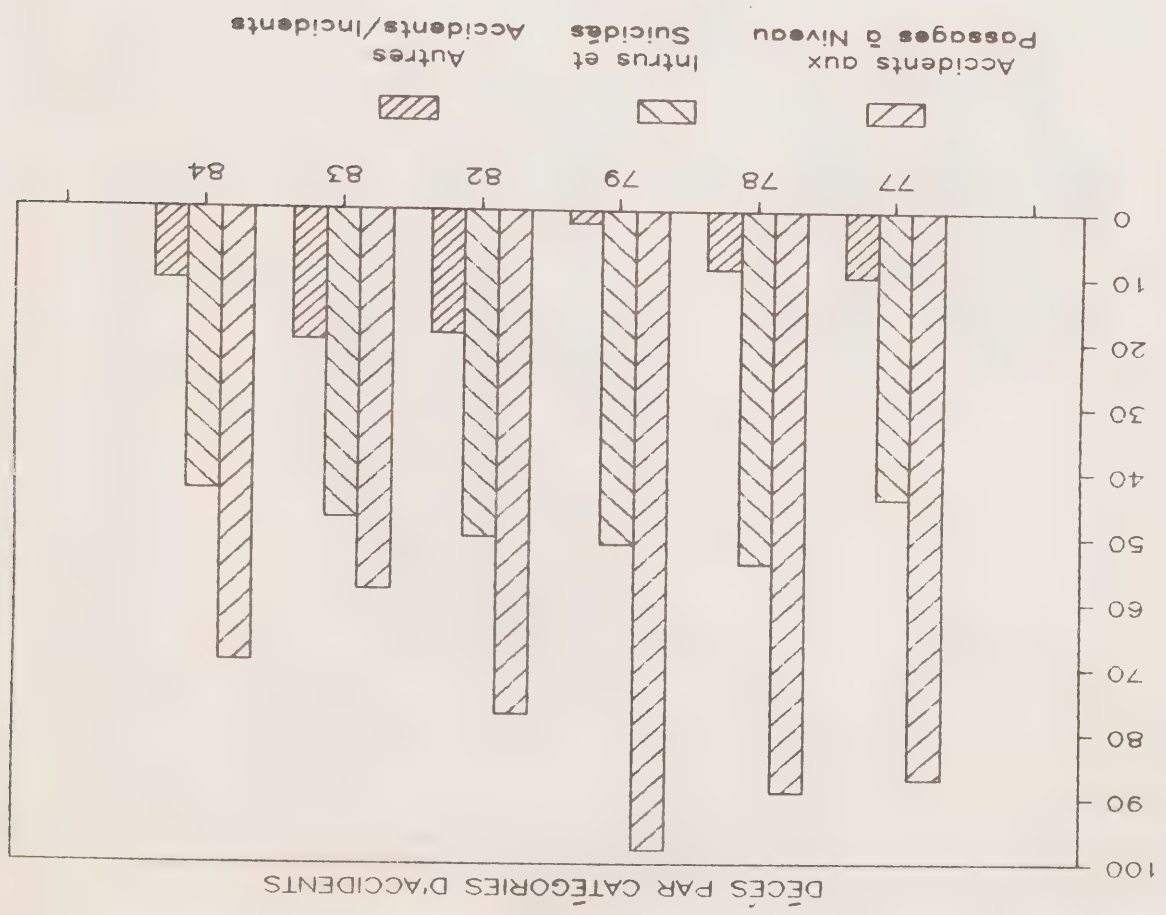


Nombre Total de Blessures : 3,476

BLESSURES PAR CATEGORIES D'ACCIDENTS/INCIDENTS

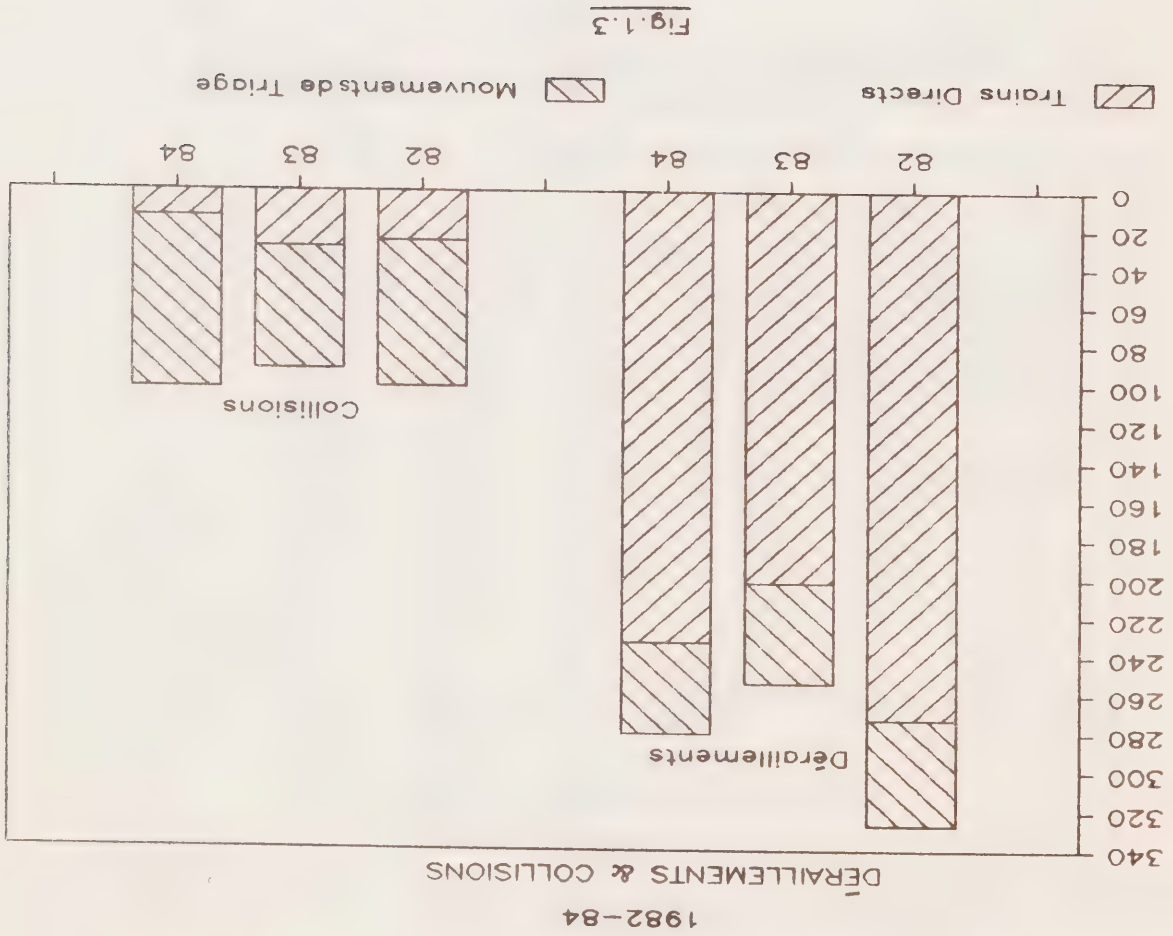
1984

Fig.1.4



DÉCÈS PAR CATEGORIES D'ACCIDENTS

1977-84



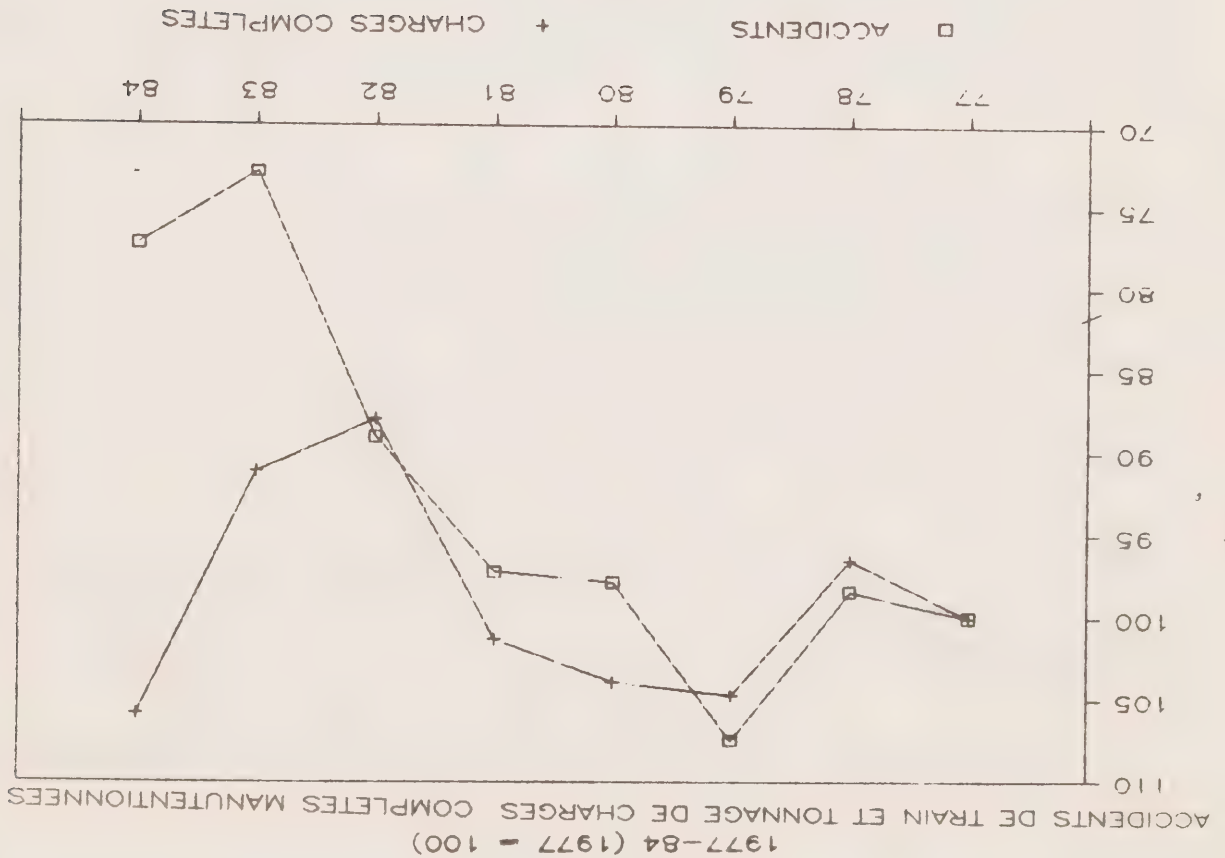
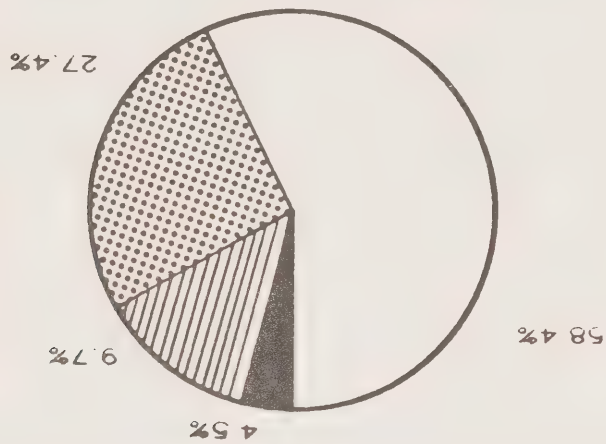


Fig. 1.1

ACCIDENTS DE TRAIN PAR CATEGORIE



Nbre Total d'Accidents : 1,018

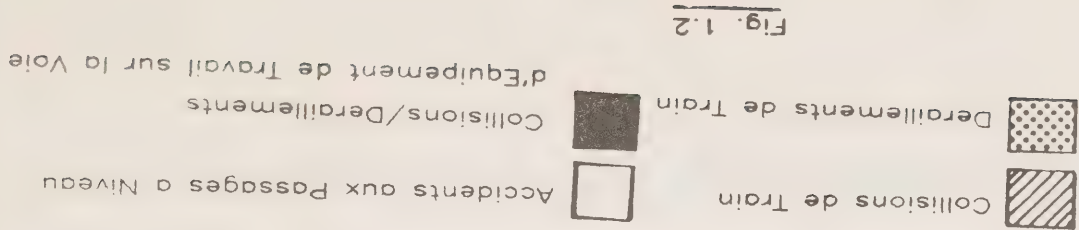


Fig. 1.2

d'Equipement de Travail sur la Voie

mais la plupart des accidents touchaient des employés qui se sont blessés en montant sur du matériel roulant ou en descendant.

Au nombre de 3 210 en 1984, les incidents varient considérablement, depuis les incendies et les fuites de marchandises dangereuses (non reliés aux accidents ferroviaires) jusqu'aux blessures subies par des passagers et des employés des compagnies ferroviaires. Ces blessures représentent un peu plus de trois quart de tous les incidents.

Victimes

En 1984, 123 personnes ont perdu la vie lors d'accidents ferroviaires, chiffre qui se rapproche beaucoup de celui de 1983 (125 victimes). Un peu plus de la moitié de ces accidents mortels se sont produits à des passages à niveau. Bien que les accidents aux passages à niveau soient à l'origine de la plupart des décès reliés au chemin de fer, les personnes qui y perdent la vie ne sont pas des passagers ou des employés des compagnies ferroviaires. En effet, presque tous les décès étaient des occupants de véhicules à moteur. Les accidents relatifs au service de train ont causé 41 p. 100 des décès; il s'agissait dans la plupart des cas d'intrusions ou de suicides.

Le nombre de blessés a diminué de 1,0 p. 100 en 1984. Les incidents ont été la cause de trois quarts des 3 476 cas de blessures (passagers, employés ou autres) en 1984 (figure 1.5). Comme le mentionne la partie 7, il n'y a pas de critère minimal quant à la sévérité des blessures pour que celles-ci fassent l'objet d'un rapport. On peut donc tout signaler, depuis la simple chute jusqu'à la perte d'un membre. Les accidents relatifs au service de train et ceux aux passages à niveau étaient à l'origine de 15 p. 100 et de 8 p. 100 respectivement du nombre total de blessures subies.

Un peu plus de trois quarts de tous les blessés en 1984 étaient des employés, 12,4 p. 100 des voyageurs et les autres des passagers de véhicules à moteur, pour la plupart.

c) au cours duquel les passagers de train subissent des blessures (éventuellement autre qu'un accident de train ou un accident relatif au service de train).

Accidents et incidents

Exception faite de 1979, le nombre total d'accidents de train a diminué progressivement dans la dernière décennie et a atteint un minimum record en 1983. En 1984, 1 018 accidents de train sont survenus, ce qui représente une augmentation de 5,4 p. 100 par rapport à l'année précédente. Il faut cependant souligner que le rapport entre les accidents et les travaux accomplis a en fait diminué puisque la charge totale par wagon s'est accrue de 16,1 p. 100 au cours de l'année. Les analyses révèlent également que le trafic ferroviaire était à son plus bas pendant la période de récession de 1982 et à son point culminant en 1984; pourtant, le nombre total d'accidents de train en 1984 a diminué de 13,6 p. 100 par rapport à 1982 (figure 1.1). Par ailleurs, les accidents associés au service de train ont diminué de 18,6 p. 100 au cours de l'année par rapport à 1983, tandis que les incidents ont augmenté de 9,7 p. 100.

Environ 60 p. 100 des 1 018 accidents de train enregistrés en 1984 sont survenus à des passages à niveau (figure 1.2), soit 4,9 p. 100 de plus que l'année précédente. Les déraillements de train, qui représentaient 27 p. 100 des accidents de train, ont augmenté de 9,8 p. 100 en 1984.

Cependant, les accidents aux passages à niveau et les déraillements, qui font respectivement le plus de victimes et de dommages matériels, étaient beaucoup moins nombreux qu'en 1982. Les déraillements et les collisions qui se produisent au cours de manoeuvres d'aiguillage ne font ordinairement l'objet d'un rapport que s'ils mettent en cause des marchandises dangereuses ou font des victimes. La figure 1.3 montre que les trains directs sont l'objet de la majorité des déraillements mais c'est l'inverse dans le cas des collisions. En effet, si les collisions, qui représentaient 10 p. 100 des accidents de train, ont augmenté de 7,6 p. 100 au cours de l'année, c'est à cause du grand nombre de collisions mineures qui se sont produites dans les gares de triage au cours de manoeuvres d'aiguillage. Le reste des accidents de train consistent en des collisions et des déraillements mettant en cause l'équipement de travail utilisé sur les voies tel que des drâsines. Les accidents de cette nature ont connu une baisse de 15,1 p. 100 en 1984.

Les données récentes sur les accidents de train montrent également que deux tiers du nombre total de collisions de train signalées touchent des wagons contenant des marchandises dangereuses (M.D.). Cependant, 94 p. 100 de ces collisions ont eu lieu dans les gares de triage au cours de manoeuvres d'aiguillage. Plus du tiers de tous les déraillements de train mettent en cause des M.D. et 41 p. 100 d'entre eux sont survenus dans les gares de triage ou sur les voies d'évitement. Le risque qu'il se produise à un passage à niveau un accident mettant en cause des M.D. a beaucoup diminué. En 1984, cette catégorie représentait moins de 2 p. 100 de tous les accidents survenus aux passages à niveau.

En 1984, il y a eu 572 accidents relatifs au service de train. On compte quelques cas d'employés ou d'intrus frappés par du matériel roulant,

PARTIE I

RÉSUMÉ DES ÉVÉNEMENTS FERROVIAIRES

Pour les besoins du présent rapport, il convient de définir les termes suivants:

Événement ferroviaire

Terme générique désignant les accidents de train, les accidents relatifs au service de train et les incidents qui ont été signalés à la Commission conformément aux exigences de l'article 225 de la Loi sur les chemins de fer, de l'ordonnance générale 0-1 et des ordonnances et règlements connexes de la CCT.

Accident de train

Événement lié à l'exploitation d'un train, d'une locomotive, d'un wagon, d'une draine ou de toute autre machine d'entretien de la voie (MEV), qui entraîne des dommages matériels excédant 750 \$ sur une voie principale ou qui fait des victimes ou met en cause des marchandises dangereuses dans les gares de triage ou sur une voie principale, et au cours duquel:

a) du matériel roulant déraille (déraillement);

b) du matériel ferroviaire roulant heurte d'autre matériel ferroviaire roulant (collision) ou un véhicule à un passage à niveau (accident à un passage à niveau).

Accident relatif au service de train

Événement lié à l'exploitation d'un train, d'une locomotive, d'un wagon, d'une draine ou de toute autre machine d'entretien de la voie (MEV), au cours duquel:

a) un employé d'une compagnie ferroviaire subit des blessures lorsqu'il est heurté par du matériel

ferroviaire roulant ou lorsqu'il monte à bord du matériel roulant ou en descendant;

b) un intrus ou un passager subit des blessures lorsqu'il est heurté par du matériel ferroviaire roulant ou lorsqu'il monte à bord du matériel roulant ou en descendant.

Incident

Événement, autre qu'un accident, lié à l'exploitation d'un train et

a) qui compromet ou pourrait compromettre la sécurité de l'exploitation;

b) au cours duquel les employés d'une compagnie ferroviaire subissent des blessures dans l'exécution de leurs fonctions (événements autres qu'un accident de train ou un accident relatif au service de train);

RÉSUMÉ DES ÉVÉNEMENTS FERROVIAIRES

PARTIE 1

INTRODUCTION

- 1 -

Les accidents et les incidents ferroviaires sont des événements imprévus mettant en cause des trains, des locomotives, des wagons ou de l'équipement de travail sur la voie, qui compromettent ou pourraient compromettre la sécurité des activités ferroviaires. Les compagnies de chemin de fer qui relèvent de la compétence fédérale doivent aviser la Commission canadienne des transports d'un événement ferroviaire s'il entraîne des dommages à la propriété, fait des victimes ou met en cause des marchandises dangereuses. Aux fins du présent rapport, les événements ferroviaires ont été classés en trois grandes catégories, soit les accidents de train, les accidents relatifs au service de train et les incidents divers. Les accidents de train comprennent les collisions, les déraillements et les accidents aux passages à niveau. En général, les collisions et les déraillements provoquent le plus de dommages matériels tandis que les accidents aux passages à niveau sont ceux qui font le plus de victimes. Les accidents relatifs au service de train comprennent les cas où des employés ou des intrus sont heurtés par du matériel roulant et ceux où des employés se blessent en montant dans un train ou en descendant. Quant aux incidents, ils englobent les incendies, les fuites de produits dangereux, les obstacles sur la voie principale et les blessures diverses subies par les passagers ou les employés des compagnies ferroviaires.

Le relevé de 1982 diffère des publications antérieures en ce sens qu'il explique avec plus de détail l'information qui y est présentée. Les relevés des années suivantes ont essentiellement la même présentation: ils renferment surtout les données pour l'année en cours et les comparent avec les données analogues de l'année précédente. Chaque partie examine une catégorie d'accident particulière ainsi que les accidents/incidents et les victimes associées à cette catégorie.

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DIRECTION DE L'EXPLOITATION
COMITE DES TRANSPORTS PAR CHEMIN DE FER
OTTAWA, CANADA
1985

RELEVÉ DES
ACCIDENTS/INCIDENTS FERROVIAIRES
RAPPORTÉS À LA
COMMISSION CANADIENNE DES TRANSPORTS
EN 1984





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ACCIDENTS/INCIDENTS FERROVIAIRES
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EN 1984

DIRECTION DE L'EXPLOITATION
COMITÉ DES TRANSPORTS PAR CHEMIN DE FER
OTTAWA, CANADA
1985



Commission canadienne
des transports

Canadian Transport
Commission

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1985
SUMMARY OF
RAILWAY ACCIDENTS/INCIDENTS
AS REPORTED TO THE
CANADIAN TRANSPORT COMMISSION

OPERATIONS BRANCH
RAILWAY TRANSPORT COMMITTEE
OTTAWA, CANADA
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1986



Railway Transport Committee
Canadian Transport Commission
15 Eddy Street, 14th Floor
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INTRODUCTION

Railway accidents and incidents are unexpected occurrences involving trains, engines, cars or on-track equipment, that affect or could affect the safety of rail operations. Railroads under federal jurisdiction are required to advise the Canadian Transport Commission on railway occurrences if they result in property damage or casualty or involve the handling of dangerous goods. For the purposes of this report, railway occurrences have been classified into three broad categories: Train Accidents, Train Service Accidents and Incidents. Train Accidents include collisions, derailments and highway/railway crossing accidents; as a rule collisions and derailments are more costly in terms of physical damage while crossing accidents cause more casualties. Train Service Accidents include cases where employees or trespassers are struck by rolling stock or where personnel are injured in the process of entraining and detraining. Incidents include fires, dangerous commodity leakages, obstruction to main track and miscellaneous personal injuries sustained by railway passengers and employees.

Beginning with the 1982 version of the Accidents/Incidents Summary, the format of the publication changed in that an attempt was made to provide the reader with a fuller interpretation of the information being presented. The subsequent summaries have followed a similar format: the primary emphasis being on data for the current year and how it compares with comparable figures for the previous year. Each section examines a particular accident category, the associated accidents/incidents and related casualties.

With the increased attention being focussed on railway accidents, particularly train collisions and derailments, the 1985 Summary introduces a new section, in which an attempt is made to separate out serious train collisions and derailments from minor cases. A set of criteria for establishing the severity of an accident are defined in Section 8 and figures for serious accidents are presented for the years 1983-85.

SECTION 1 Summary of Railway Occurrences

SECTION 1

SUMMARY OF RAILWAY OCCURRENCES

For purposes of this report, the following definitions have relevance:

Railway Occurrence

A generic expression that includes Train Accidents, Train Service Accidents and Incidents which were reported to the Commission pursuant to the requirements of S. 225 of the Railway Act, General Order 0-1 and related orders and regulations of the CTC.

Train Accident

An occurrence associated with the operation of a train, engine, car, track motor car (TMC) or other maintenance of way equipment (MWE) involving property damage in excess of \$750 for main line operations, and casualties or dangerous commodities in respect of both main line and yard operations, in which: -

- a) unit(s) of rolling stock derail (derailment)
- b) unit(s) of railway rolling stock collide with other unit(s) of railway rolling stock (collision) or with vehicular traffic at level crossings at grade (crossing accident).

Train Service Accident

An occurrence associated with the operation of a train, engine, car, track motor car (TMC) or other maintenance of way equipment (MWE), in which:-

- a) an employee of the railway company is injured as a result of being struck by railway rolling stock or while in the process of entraining and detraining said rolling stock;
- b) a trespasser or passenger is injured as a result of being struck by railway rolling stock or while in the process of entraining or detraining said rolling stock.

Incident

An occurrence, other than an accident, associated with the operation of a train:-

- a) which affects or could affect the safety of operation
- b) whereby railway employees sustain personal injuries resulting from the performance of their duties (other than by a Train Accident or Train Service Accident)
- c) whereby railway passengers sustain personal injuries (other than by a Train Accident or Train Service Accident).

Occurrences are reportable only if they take place on track owned by railroads under federal jurisdiction. When statistics are presented by railroad in this report, railroad refers to the owner of the trackage and not necessarily of the train.

In 1985, there were a total of 993 Train Accidents reported to the Canadian Transport Commission, a decrease of 2.3% from the previous year's total of 1,016. Rail traffic in 1985, as measured in carload tonnage handled, was also down from 1984 but only by 0.7%. The ratio of accidents to work performed which dropped sharply in 1983, has continued its downward trend with the last two years being the best on record (Fig. 1.1).

Just over 60% of the above 993 Train Accidents in 1985 were those at railway grade crossings (Fig. 1.2), and these were up slightly (1.5%) over the 1984 total. Train derailments which accounted for a further 28%, also showed a slight increase (1.8%). Both crossing accidents and train derailments which are the most serious in terms of loss of life and financial costs respectively appear to have leveled off over the past two years. Furthermore, the accident rates for these classes of accidents during these years are well below the rates recorded during the 1979-82 period. Derailments and collisions that occur during yard operations are normally only reportable if they involve dangerous commodities (D.C.) or result in a casualty. It can be seen from Fig. 1.3 that although accidents on the main track account for the majority of train derailments, the reverse is the case for train collisions. Train collisions which accounted for some 7% of all Train Accidents were down substantially (29.4%) from 1984. As pointed out, most train collisions occur in yards and are usually minor sideswipes during the course of switching/humping operations. The remaining accidents in the Train Accident Category are collisions/derailments involving on-track equipment such as track motor cars; these also declined in 1985 (15.6%).

Train Accidents figures for 1985 also show that some 60% of the total reportable train collisions involved D.C. cars; however, nearly all of these D.C. related collisions occurred in yards during switching operations. Approximately half of all train derailments were D.C. related and of these over two-thirds occurred in yards or sidings. The risk of D.C. involvement in a crossing accident is considerably less; in 1985 less than 2% of all crossing accidents were D.C. related. Train accidents are classified as D.C. related when they directly involve D.C. cars (loaded or empty). The vast majority of these cases do not result in any loss of product.

The absolute total of train collisions and derailments together has averaged 357 per annum over the past three years 1983-85. This may appear to be a large figure since it averages out to an accident a day. However, the minimum damage threshold for reporting a derailment or collision on the main track is rather low (\$750). Many of the derailments reported to the Canadian Transport Commission are of a minor nature involving the derailment of only one or two cars, and as has already been indicated above, many of the collisions are minor sideswipes that occur in yards. Separating out the more serious cases from the above 357 total, there was an average of 66 serious accidents per year over the 1983-85 period. Three-fourths of the above serious accidents were those involving property damage in excess of \$100,000; but half of these property damage accidents were under \$250,000. The other one-quarter was classified as serious due to the severity of D.C./casualty involvement.

Crossing accidents comprise the major portion of Train Accidents. In terms of severity, 34% of the 605 crossing accidents in 1985 resulted in an injury and 8% resulted in a fatality. It has already been pointed out that

crossing accidents as a rule are not as serious as collisions and derailments in terms of D.C. involvement or financial damage to railway property/equipment.

Train Service Accidents numbered 531 in 1985, which was a decline of 7.2% on 1984. Although these include employees/passengers/trespassers being struck by rolling stock, the majority of these accidents involved employees injured while getting off/on rolling stock.

There were 3,264 Incidents in 1985, which was an increase of 1.6% over the 1984 figure. These cover a wide variety of occurrences ranging from fires and D.C. leakages (not related to train accidents), to personal injuries incurred by railway employees and passengers. These personal injuries accounted for nearly four-fifths of all Incidents.

Casualties

Railway related fatalities increased from 125 in 1984 to 131 in 1985. This increase was due to the sharp rise (39.5%) of trespasser deaths to a total of 60 in 1985. These accounted for almost half of all railway fatalities and it can be argued that the railways cannot take meaningful preventative action in respect of many of these accidents. Crossing accidents accounted for a further 44% of total fatalities. Although crossing accidents have always accounted for a major portion of railway fatalities (Fig. 1.4), the persons killed are usually not railway employees or passengers. Almost all fatalities at railway crossings are motor vehicle occupants.

The total number of injuries in 1985 declined by 1.0% from 1984. Incidents accounted for nearly three-fourths of the 3,542 injuries to passengers, employees and others during the year (Fig. 1.5). As mentioned in Section 7, there is no minimum severity for the reporting of these miscellaneous incident injuries: they range from a loss of a limb to a minor slip or fall. Train Service Accidents and accidents at railway crossings respectively accounted for a further 13% and 9% of total injuries.

Three-fourths of all injuries in 1985 were to employees; passengers accounted for another 16%. Motor vehicle occupants accounted for most of the remaining injuries.

Fig. 1.1
1978 - 85 (1978 = 100)
TRAIN ACCIDENTS & CARLOAD TONNAGE HANDLED

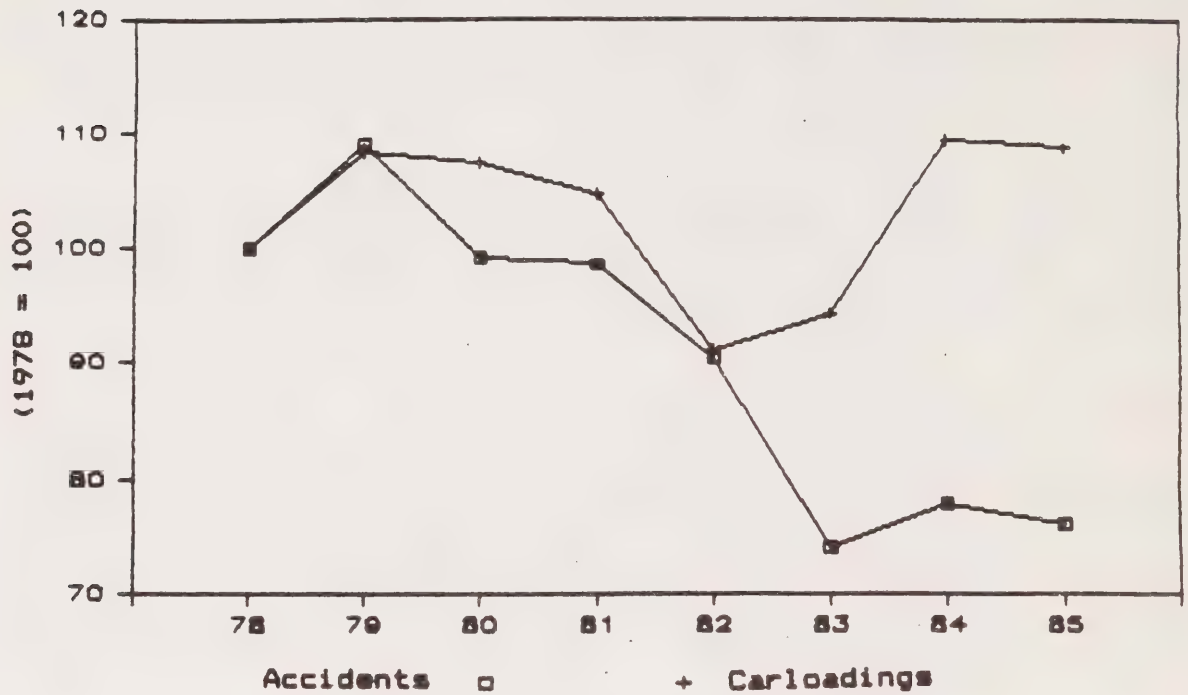
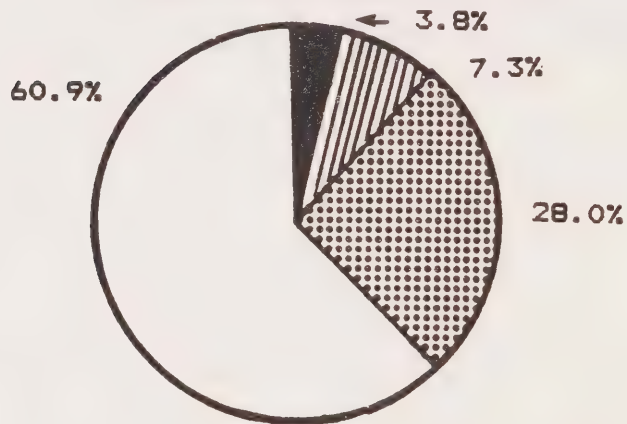


Fig. 1.2
1985
TRAIN ACCIDENTS BY TYPE



Total Number of Accidents : 993



Fig. 1.3
1984 - 85
TRAIN DERAILMENTS & COLLISIONS

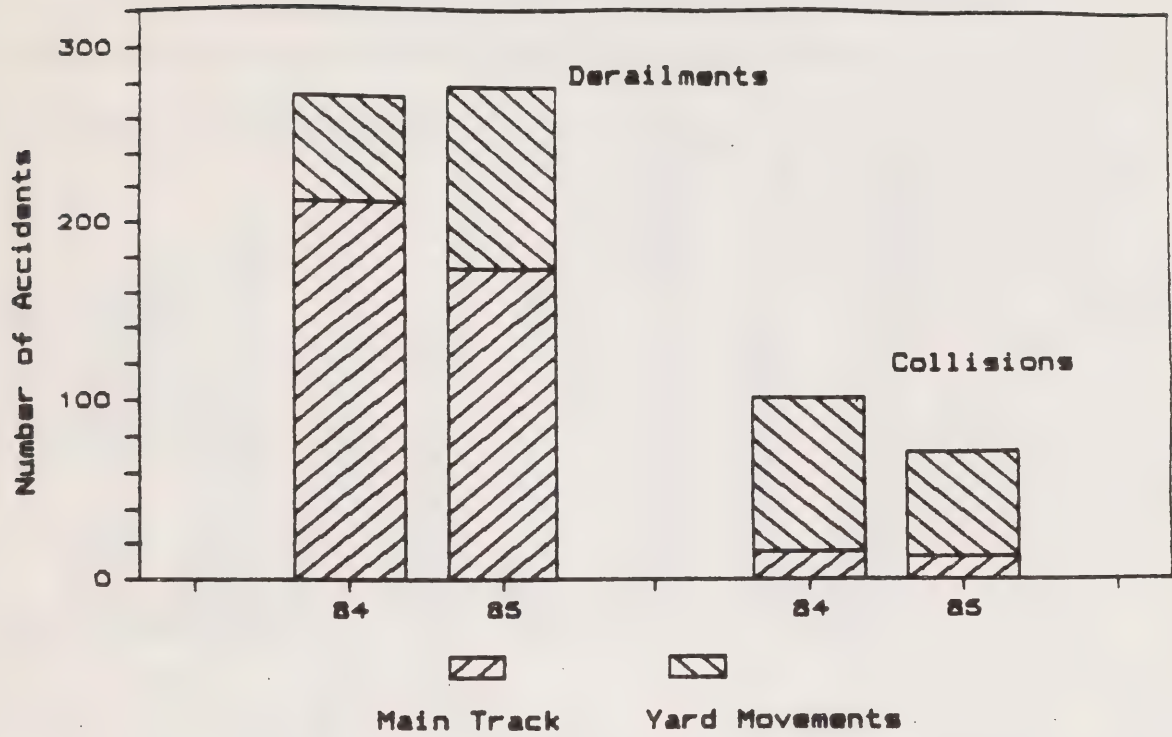


Fig. 1.4
1978 - 85
FATALITIES BY TYPE OF ACCIDENT

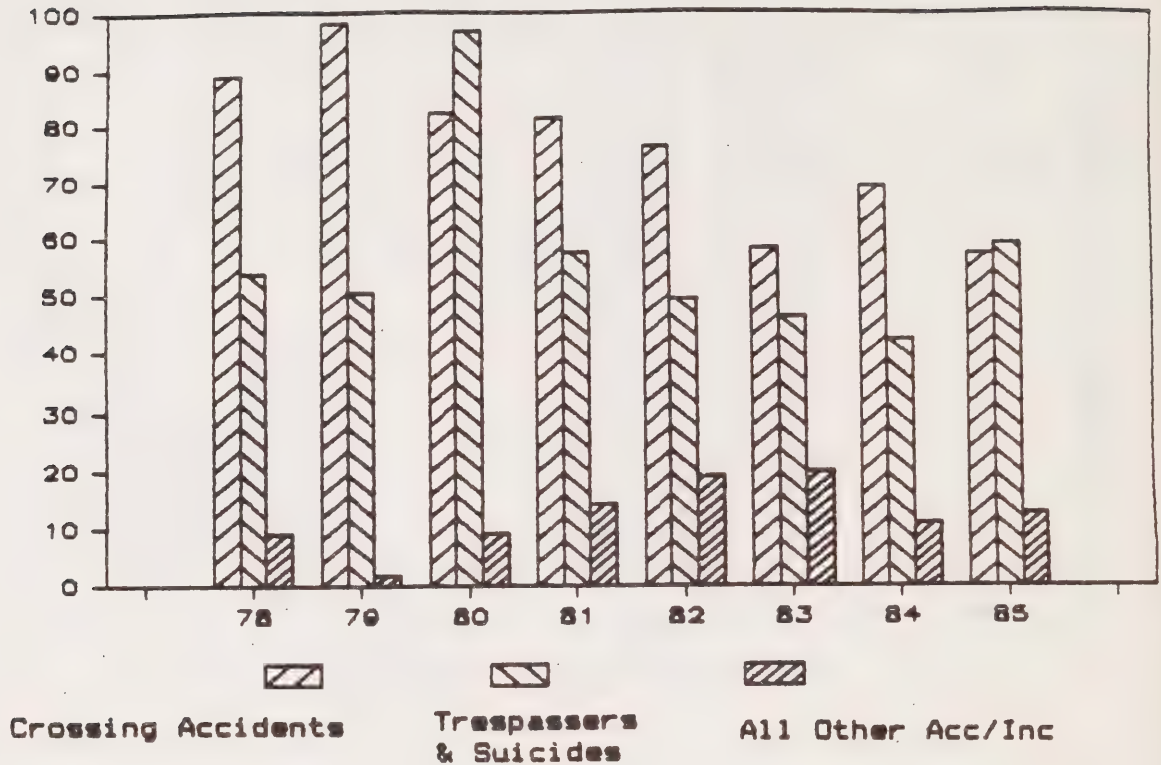
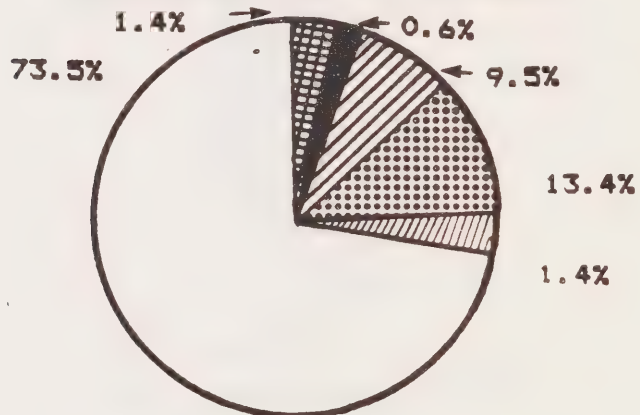
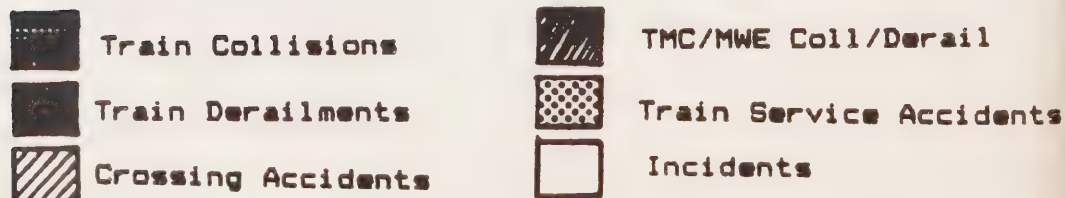


Fig. 1.5
1985
INJURIES BY TYPE OF ACCIDENT



Total Number of Injuries : 3542



SECTION 1

SUMMARY OF RAILWAY OCCURRENCES

1.1 NUMBER OF ACCIDENTS AND INCIDENTS (1984 and 1985 Summary)

	<u>Accidents/Incidents</u>		
	<u>1984</u>	<u>1985</u>	<u>% Change</u>
<u>Train Accidents</u>			
Train Collisions	102	72	-29.4
Train Derailments	273	278	1.8
Crossing Accidents	596	605	1.5
TMC/MWE Collisions/Derailments*	<u>45</u>	<u>38</u>	<u>-15.6</u>
TOTAL	1,016	993	-2.3
<u>Train Service Accidents</u>			
Employees Struck by Rolling Stock	38	27**	-28.9
Trespassers Struck by Rolling Stock	101	107	5.9
Employees Getting Off/On Rolling Stock	<u>433</u>	<u>397</u>	<u>-8.3</u>
TOTAL	572	531	-7.2
<u>Incidents</u>			
Fires	202	226	11.9
Dangerous Commodities Incidents	418	336	-19.6
All Other Incidents	<u>2,564</u>	<u>2,702</u>	<u>5.4</u>
TOTAL	3,214	3,264	1.6

*TMC: Track Motor Car; MWE: Maintenance of Way Equipment

** Includes 1 passenger

1.2 NUMBER OF ACCIDENTS AND INCIDENTS (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Train Accidents</u>								
Train Collisions	66	80	97	108	101	92	102	72
Train Derailments	295	339	292	348	327	254	273	278
Crossing Accidents	871	937	826	763	691	567	596	605
TMC/MWE Collisions/ Derailments*	<u>72</u>	<u>68</u>	<u>81</u>	<u>69</u>	<u>61</u>	<u>53</u>	<u>45</u>	<u>38</u>
TOTAL	1,304	1,424	1,296	1,288	1,180	966	1,016	993
<u>Train Service Accidents**</u>	N/A	N/A	N/A	729	614	703	572	531
<u>Incidents</u>								
Fires	240	246	229	221	273	254	202	220
D.C. (leakages, etc.)	47	51	107	157	105	288	418	330
All Other Incidents**	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,564</u>	<u>2,702</u>
TOTAL				3,264	3,189	2,925	3,214	3,262
<u>D.C. Related Portion of Train Accidents</u>								
Train Collisions	14	17	44	65	67	56	66	43
Train Derailments	43	42	65	132	101	94	100	142
Crossing Accidents	-	2	11	4	8	9	10	8
<u>Carload Traffic Handled (Thousands of Metric Tonnes)</u>								
	218.8	237.4	235.6	229.7	199.4	206.7	239.9	238.2

*TMC: Track Motor Car; MWE: Maintenance of Way Equipment

** Beginning with the 1982 Report, the statistical presentation of accident statistics changed. A complete time series is not possible as in earlier years a large portion of the injuries sustained in the above Train Service Accidents were included under Miscellaneous Personal Injuries.

1.3 CASUALTIES BY ACCIDENT/INCIDENT (1984 and 1985 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Other</u>		<u>Total</u>	
	1984	1985	1984	1985	1984	1985	1984	1985
<u>FATALITIES</u>								
<u>Train Accidents</u>								
Train Collisions	-	-	-	-	-	-	-	-
Train Derailments	1	1	-	-	-	-	1	1
Crossing Accidents	1	1	-	-	69	57	70	58
TMC/MWE Collisions/ Derailments*	-	2	-	-	-	-	-	2
<u>Train Service Accidents</u>	7	3	-	-	44	60	51	63
<u>Incidents</u>								
Fires	-	-	-	-	-	-	-	-
D.C. Incidents	-	-	-	-	-	-	-	-
All Other Incidents	2	4	-	1	-	2	2	7
TOTAL	11	11	-	1	113	119	124	131

INJURIES

<u>Train Accidents</u>								
Train Collisions	48	44	25	3	-	1	73	48
Train Derailments	27	22	-	-	-	-	27	22
Crossing Accidents	20	17	7	51	262	268	289	336
TMC/MWE Collisions/ Derailments*	57	50	-	-	-	-	57	50
<u>Train Service Accidents</u>	464	421	-	1	61	53	525	475
<u>Incidents</u>								
Fires	3	-	-	-	-	-	3	-
D.C. Incidents	5	7	-	-	-	-	5	7
All Other Incidents	2,096	2,106	397	497	1	1	2,494	2,604
TOTAL	2,720	2,667	429	552	324	323	3,473	3,542

*TMC: Track Motor Car; MWE: Maintenance of Way Equipment

1.4 CASUALTIES BY TYPE OF PERSON (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Fatalities</u>								
Passengers	-	-	-	1	1	4	-	1
Employees	9	10	10	13	17	16	11	11
Other	<u>143</u>	<u>141</u>	<u>179</u>	<u>140</u>	<u>128</u>	<u>106</u>	<u>113</u>	<u>119</u>
TOTAL	152	151	189	154	146	126	124	131
<u>Injuries</u>								
Passengers	420	400	334	636	667	534	429	552
Employees	2,909	3,358	3,137	3,189	2,962	2,658	2,720	2,667
Other	<u>437</u>	<u>453</u>	<u>428</u>	<u>412</u>	<u>337</u>	<u>319</u>	<u>324</u>	<u>323</u>
TOTAL	3,766	4,211	3,899	4,237	3,966	3,511	3,473	3,542

SECTION 2 Collisions

SECTION 2

COLLISIONS

(Involving Train Movements Only)

Accidents

A train collision is an accident where a moving train, engine or car comes in contact with another train, engine or car. Collisions on main track with railway property damage above \$750 (or on any track if involving dangerous goods traffic or casualty) are reportable.

Train collisions numbered 72 in 1985, a sharp decline (29.6%) over the figure in 1984 (Fig. 2.1). Four-fifths of these collisions occurred in yards and these were down by 31.8% from the previous year. The vast majority of these yard collisions were minor sideswipes that occurred in the course of switching and humping operations. Collisions on the main track were down by 17.6%. Of the 14 main track collisions in 1985, six were side collisions, four were switching accidents, one was a rear-end collision and the remaining three were head-on. Passenger trains were not involved in any of these collisions. In 1984, only one main track collision involved a passenger train. Some 60% of all train collisions in 1985 involved cars carrying dangerous commodities (D.C.), a decline of 35.5% from 1984. Nearly all of the D.C. related collisions occurred in yards during switching operations. D.C. cars involved in collisions may be loaded or empty, but the vast majority of these cases do not result in any loss of product. Of the 72 collisions in 1985, 32 resulted in a derailment; in 1984 the figures were 102 and 41 respectively. The major causes of collisions are operations related. Employee failure - violation of operating rules and regulations - accounted for some 90% of all collisions in 1985. The rest were due to equipment failure and vandalism. An examination of rule violations indicates that the rules most often violated pertain to brake applications, cars being left foul of movements on adjacent tracks and speed infractions.

The number of main track collisions per million train-miles was 0.18 in 1985 as compared to 0.21 in 1984.

Casualties

There were a total of 48 injuries as a result of train collisions in 1985, a decline of 34% from the previous year. Between 1978 and 1985 there have been only 14 fatalities as a result of train collisions, 7 of which were in 1983; train collisions have not resulted in any fatalities over the past two years.

Fig. 2.1
1978 - 85
TRAIN COLLISIONS

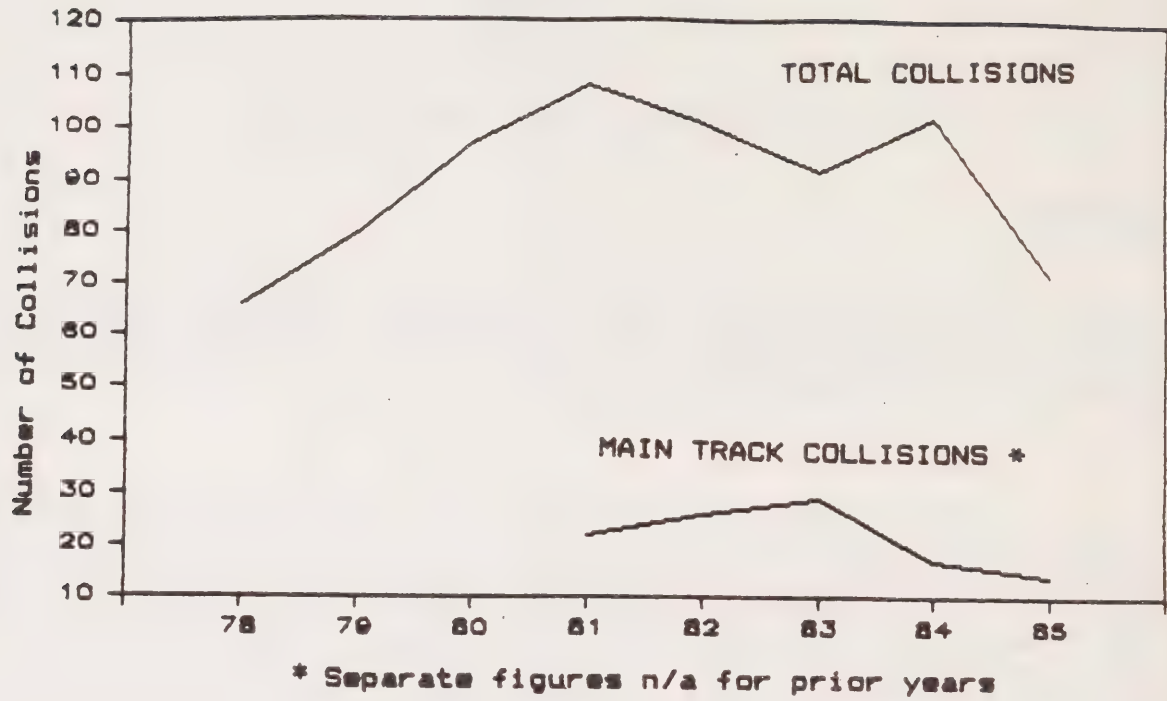
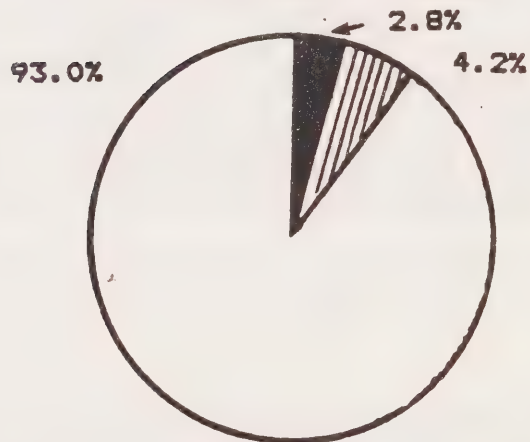


Fig. 2.2
1985
COLLISIONS BY CAUSE



Total Number of Collisions : 72



Employee
Related



Vandalism



Equipment
Related

SECTION 2

COLLISIONS

(Involving Train Movements Only)

2.1 NUMBER OF COLLISIONS (1984 and 1985 Summary)

	<u>All Collisions</u>		<u>D.C. Related Collisions</u>	
	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
<u>CN</u>				
Main Track	14	9	4	1
Yard Movements	<u>65</u>	<u>35</u>	<u>50</u>	<u>26</u>
TOTAL	79	44	54	27
<u>CP</u>				
Main Track	3	4	-	2
Yard Movements	<u>20</u>	<u>23</u>	<u>12</u>	<u>14</u>
TOTAL	23	27	12	16
<u>Other</u>				
Main Track	-	1	-	-
Yard Movements	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	-	1	-	-

	<u>% Change</u>		<u>% Change</u>	
<u>All Railways</u>				
Main Track	17	14	4	3
Yard Movements	<u>85</u>	<u>58</u>	<u>62</u>	<u>40</u>
TOTAL	102	72	66	43

%
Change

%
Change

-25.0

-35.5

-34.8

2.2 COLLISION CASUALTIES (1984 and 1985 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Total</u>	
	1984	1985	1984	1985	1984	1985
<u>FATALITIES</u>						
CN	-	-	-	-	-	-
CP	-	-	-	-	-	-
Other	-	-	-	-	-	-
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
All Railways	-	-	-	-	-	-
<u>INJURIES</u>						
CN	35	29*	25	-	60	29*
CP	13	14	-	3	13	17
Other	-	2	-	-	-	2
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
All Railways	48	45*	25	3	73	48*

* Includes 1 industrial employee

2.3 COLLISION BY CAUSE (1984 and 1985)

	<u>Main Track</u>		<u>Yard Movements</u>		<u>Total</u>	
	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
<u>CN</u>						
Operations Related	12	8	61	33	73	41
Equipment Related	1	-	3	1	4	1
Other	1	1	1	-	2	1
Undetermined	-	-	-	1	-	1
TOTAL	14	9	65	35	79	44
<u>CP</u>						
Operations Related	3	3	20	21	23	24
Equipment Related	-	-	-	2	-	2
Other	-	1	-	-	-	1
Undetermined	-	-	-	-	-	-
TOTAL	3	4	20	23	23	27
<u>Other</u>						
Operations Related	-	1	-	-	-	1
Equipment Related	-	-	-	-	-	-
Other	-	-	-	-	-	-
Undetermined	-	-	-	-	-	-
TOTAL	-	1	-	-	-	1

	<u>% Change</u>			<u>% Change</u>			<u>% Change</u>		
<u>All Railways</u>									
Operations Related	15	12	-20.0	81	54	-33.3	96	66	-31.3
Equipment Related	1	-	-100.0	3	3	0.0	4	3	-25.0
Other	1	2	100.0	1	-	-100.0	2	2	0.0
Undetermined	-	-	-	-	1	-	-	1	-
TOTAL	17	14	-17.6	85	58	-31.8	102	72	-29.4

2.4 COLLISIONS BY DETAILED CAUSE (1984 & 1985)

<u>Assessed Cause</u>	<u>1984</u>	<u>1985</u>
1. Crew communication deficiency	9	9
2. Improper handling of switches or derails	9	6
3. Insufficient or improper brake applications	26	18
4. Improper positioning of car or movement	19	15
5. Excess speed	21	17
6. Other employee failure	<u>10</u>	1
Total employee related causes (1-6)	<u>94</u>	66
7. Equipment related causes	4	3
8. Vandalism and other non-railway responsibility	4	2
9. Undetermined	<u>-</u>	<u>1</u>
TOTAL	<u><u>102</u></u>	<u><u>72</u></u>

2.5 NUMBER OF COLLISIONS AND CASUALTIES (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Number of Collisions</u>								
CN	50	46	47	69	59	61	79	44
CP	14	29	44	36	38	27	23	27
Other	<u>2</u>	<u>5</u>	<u>6</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>-</u>	<u>1</u>
All Railways	66	80	97	108	101	92	102	72
<u>Number of Casualties</u>								
<u>Fatalities</u>								
CN	-	1	-	3	-	2	-	-
CP	-	2	1	-	-	5	-	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
All Railways	-	3	1	3	-	7	-	-
<u>Injuries</u>								
CN	81	48	31	47	127	95	60	29
CP	-	15	21	19	16	34	13	17
Other	<u>2</u>	<u>9</u>	<u>9</u>	<u>1</u>	<u>4</u>	<u>34</u>	<u>-</u>	<u>2</u>
All Railways	83	72	61	67	147	163	73	48

2.6 MAIN TRACK TRAIN COLLISIONS PER MILLION TRAIN-MILES (MTM) (1978-1985)**

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>CN</u>								
Total Collisions	50	46	47	69	59	61	79	44
Main Track Train Collisions*				13	15	18	14	14
MTM	50.9	52.2	50.5	48.6	41.0	42.9	46.3	44.0
Main Track Train Collisions Per MTM				.27	.37	.42	.30	.32
<u>CP</u>								
Total Collisions	14	29	44	36	38	27	23	24
Main Track Train Collisions*				8	9	9	3	3
MTM	30.0	29.6	29.6	29.7	26.4	26.8	28.2	28.2
Main Track Train Collisions Per MTM				.27	.34	.34	.11	.11
<u>Other</u>								
Total Collisions	2	5	6	3	4	4	-	-
Main Track Train Collisions*				2	2	2	-	-
MTM	9.5	9.8	9.2	7.6	6.5	6.3	6.8	6.8
Main Track Train Collisions Per MTM				.26	.31	.32	-	-
<u>All Railways</u>								
Total Collisions	66	80	97	108	101	92	102	72
Main Track Train Collisions*				22	26	29	17	14
MTM	90.4	91.6	89.2	85.8	73.9	76.0	81.3	79.0
Main Track Train Collisions Per MTM				.26	.35	.38	.21	.18

* Separate figures are not available for train collisions in prior years.

** MTM figures have been revised: VIA train-miles are now included in CN & CP instead of other RR.

*** Estimated

2.7 COLLISIONS AND CASUALTIES BY PROVINCE (1984-1985)

	<u>1984</u>			<u>1985</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	-	-	-	-	-	-
Prince Edward Island	1	-	-	-	-	-
Nova Scotia	-	-	-	-	-	-
New Brunswick	3	-	-	3	-	3
Quebec	19	-	13	11	-	14
Ontario	28	-	42	13	-	10
Manitoba	7	-	3	7	-	5
Saskatchewan	2	-	-	6	-	3
Alberta	19	-	5	15	-	3
British Columbia	22	-	10	17	-	10
Yukon	-	-	-	-	-	-
North West Territories	1	-	-	-	-	-
 CANADA	 102	 -	 73	 72	 -	 48

SECTION 3 Derailments

SECTION 3

DERAILMENTS

(Involving Train Movements Only)

Accidents

A train derailment is an accident where any moving train, engine or car is derailed. Reporting criteria are the same as for collisions: derailments are reportable if they occur on main track with railway property damage above \$750 (or any track if involving dangerous goods traffic or casualty). However, unlike collisions, most reportable derailments involve trains operating over main track as opposed to yard movements (Fig. 3.1).

Derailments totalled 278 in 1985, a slight increase of 1.8% over 1984. Nearly two-thirds of these derailments occurred on the main track, a substantial decline of 17.4% from 1984. However, derailments involving yard movements increased substantially from 60 in 1984 to 102 in 1985. This increase is due at least partly to greater reporting of derailments involving empty cars which last contained a dangerous commodity (D.C.). Of the 176 main track derailments in 1984, 4 involved passenger trains; the corresponding numbers for 1984 were 213 and 6 respectively. Approximately half of all derailments in 1985 involved D.C. cars. This is a 42.0% increase over 1984. A little over two-thirds of all D.C. related derailments occurred in yards. As mentioned above, the number of train accidents involving empty cars which last contained dangerous goods are now being reported more comprehensively. This more complete reporting has been brought about not only by the increased public concern over D.C. traffic, but also due to the Railway Transport Committee's extensive discussion on accidents involving empty D.C. cars in a Decision issued in early 1985. As in the case of train collisions (Section 2), most D.C. cars (loaded or empty) involved in a derailment do not result in any loss of product.

The breakdown of main track derailments by number of cars and/or engines derailed is illustrated in Fig. 3.2. Half of all derailments on the main track resulted in the derailment of only one or two cars/engines. Single and two car/engine derailments also accounted for some 70% of all yard cases (Table 3.8). In 1985, those accidents that resulted in derailment of over 10 cars accounted for 12% of all train derailments.

In 1985, nearly two-fifths of all derailments were track related, one-quarter equipment related, one-fifth operations related and the balance attributable to miscellaneous causes (Fig. 3.3). Of the track related derailments, approximately three-fourths were due to component failures in the track itself with broken rails and joints and inadequate track geometry the major causes. The other one-quarter was the result of climatological related factors such as snow/ice on the track, slides and washouts. Some 40% of the equipment related derailments were caused by journal failures with broken wheels, defective/dragging brake gear, and defective truck components being the next most prominent causes. Rule violations and other employee failure accounted for nearly 90% of the operations related derailments. The miscellaneous category includes loading defects, vandalism, and cases of wheel lift or mounting of the rail with no significant track, equipment or operations defect identifiable. The causes of derailments are considerably different between main track and yard cases. Equipment failures almost all occurred on

the main track in 1985. On the other hand, operational and miscellaneous cases were more prevalent in respect of yard derailments. Track related cases occurred on both main track and in yards but these accounted for a higher proportion of derailments on main track than in yards (Table 3.3). The pattern of derailments by cause has remained fairly steady over the last three years (Fig. 3.4) although the miscellaneous category has fluctuated due to the variability in vandalism and combination (track/equipment/operational) cases. The lower number of track and equipment related derailments in recent years as compared to the totals in the early eighties is the result of improvements in maintenance and equipment (Table 3.4).

The number of main track derailments per billions of Freight Gross Ton-miles was 0.58 in 1985 as compared to 0.66 in 1984.

Casualties

Derailments as a rule are not serious in terms of casualties; since 1978 train derailments have resulted in a total of 5 fatalities. There was one fatality in each of the years 1984 and 1985. The number of injuries decreased from 27 in 1984 to 22 in 1985.

Fig. 3.1
1978 - 85
TRAIN DERAILMENTS

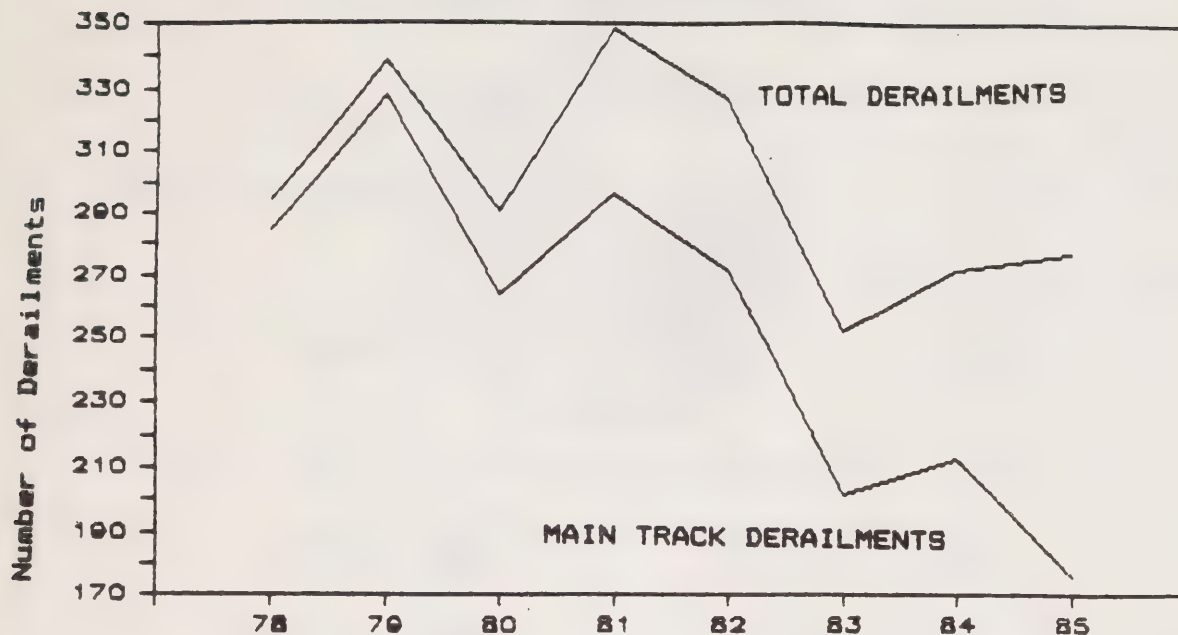


Fig. 3.2
1984 - 85
MAIN TRACK TRAIN DERAILMENTS
BY # OF CARS/ENGINES DERAILED

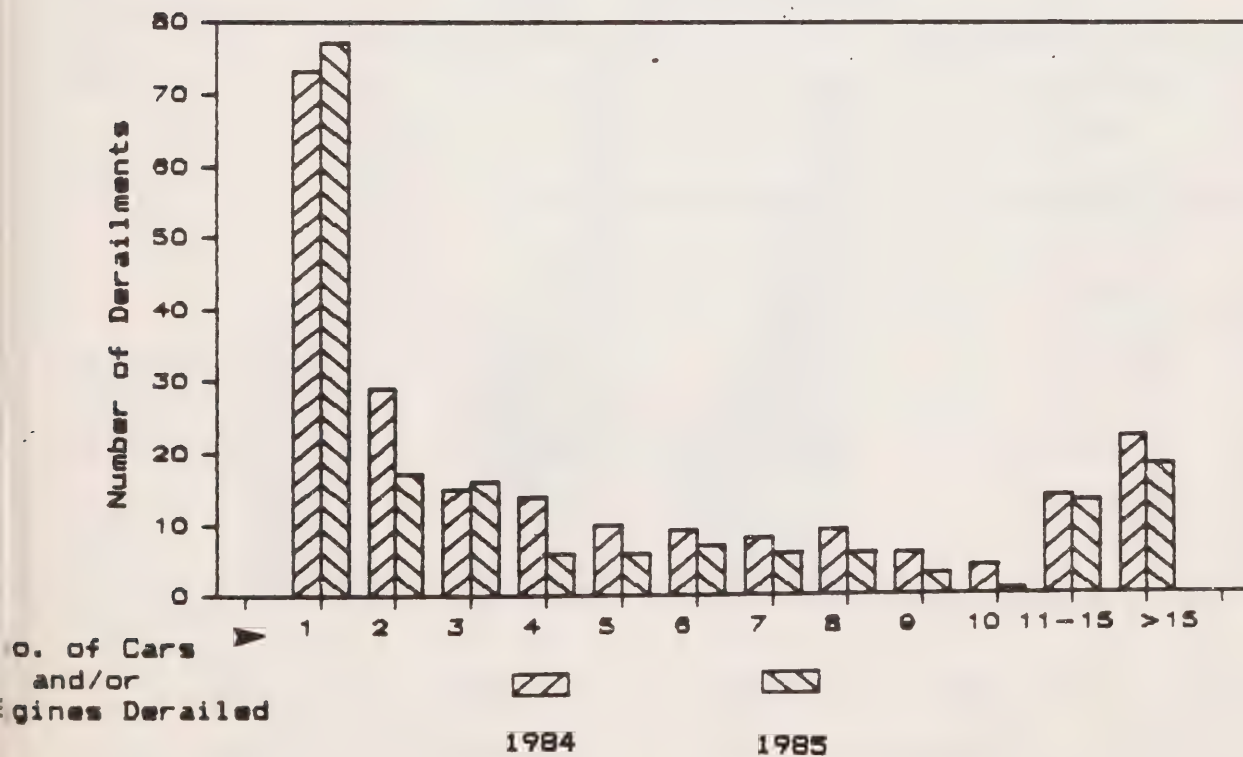
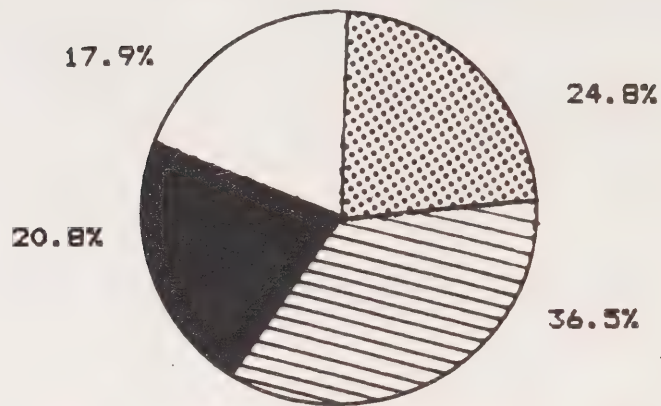


Fig. 3.3
1985
DERAILMENTS BY CAUSE



Total Number of Derailments : 278

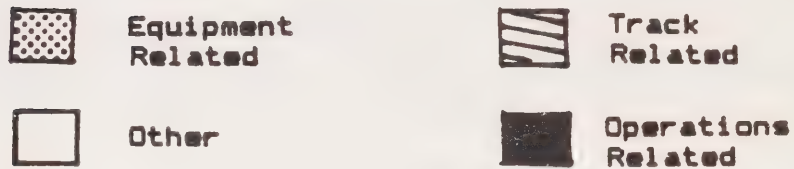
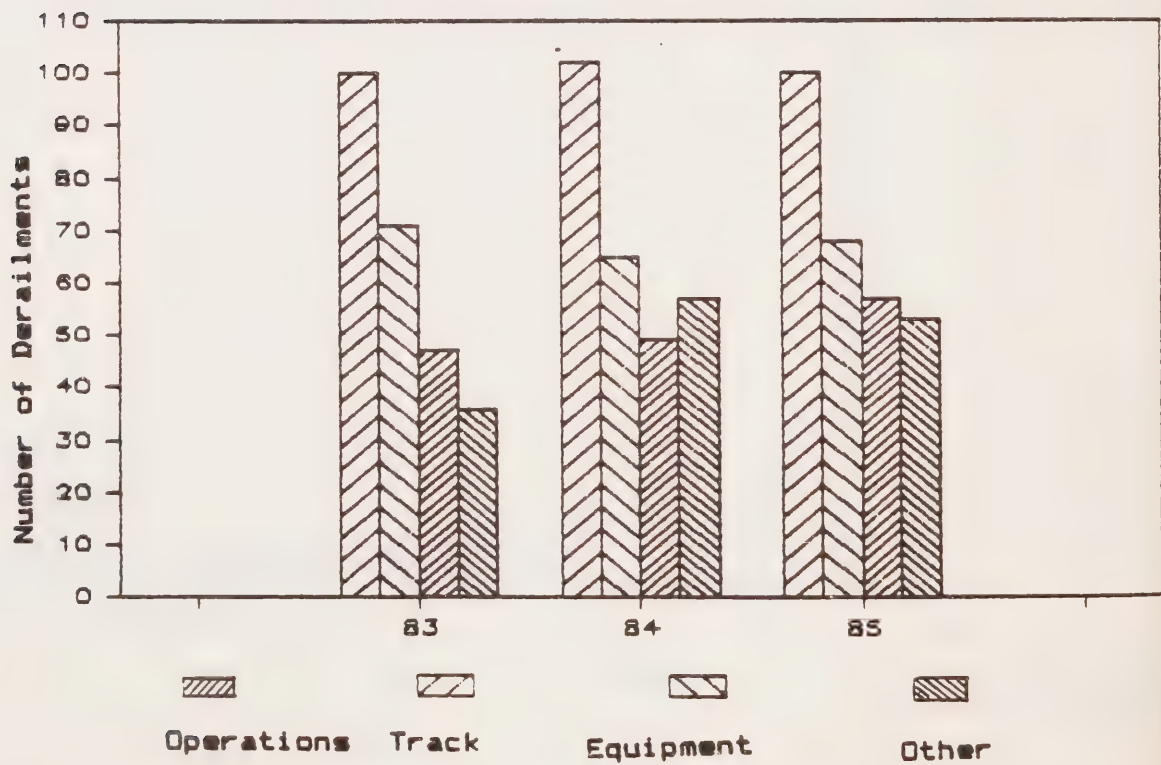


Fig. 3.4
1983 - 85
DERAILMENTS BY CAUSE



SECTION 3

DERAILMENTS

(Involving Train Movements Only)

3.1 NUMBER OF DERAILMENTS (1984 and 1985 Summary)

<u>CN</u>	<u>All Derailments</u>		<u>D.C. Related Derailments</u>	
	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
Main Track	128	108	19	26
Yard Movements	<u>38</u>	<u>51</u>	<u>34</u>	<u>47</u>
TOTAL	166	159	53	73
<u>CP</u>				
Main Track	73	59	24	19
Yard Movements	<u>13</u>	<u>35</u>	<u>12</u>	<u>35</u>
TOTAL	86	94	36	54
<u>Other</u>				
Main Track	12	9	2	-
Yard Movements	<u>9</u>	<u>16</u>	<u>9</u>	<u>15</u>
TOTAL	21	25	11	15

	<u>% Change</u>			<u>% Change</u>		
<u>All Railways</u>						
Main Track	213	176	-17.4	45	45	0.0
Yard Movements	<u>60</u>	<u>102</u>	<u>70.0</u>	<u>55</u>	<u>97</u>	<u>76.4</u>
TOTAL	273	278	1.8	100	142	42.0

3.2 DERAILMENT CASUALTIES (1984 and 1985 Summary)

	<u>Employees</u>		<u>Passengers</u>		<u>Total</u>	
	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
<u>FATALITIES</u>						
CN	-	1	-	-	-	1
CP	1	-	-	-	1	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
All Railways	1	1	-	-	1	1
<u>INJURIES</u>						
CN	14	12	-	-	14	12
CP	13	7	-	-	13	7
Other	<u>0</u>	<u>3</u>	<u>-</u>	<u>-</u>	<u>0</u>	<u>3</u>
All Railways	27	22	-	-	27	22

3.3 DERAILMENTS BY CAUSE (1984 and 1985)

	<u>Main Track</u>		<u>Yard Movements</u>		<u>Total</u>				
	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>			
<u>CN</u>									
Track Related	54	45	6	17	60	62			
Equipment Related	38	41	0	2	38	43			
Operations Related	21	11	16	21	37	32			
Other	15	11	15	11	30	22			
Undetermined	-	-	1	-	1	-			
TOTAL	128	108	38	51	166	159			
<u>CP</u>									
Track Related	30	20	4	9	34	29			
Equipment Related	23	21	-	1	23	22			
Operations Related	5	6	6	15	11	21			
Other	14	9	2	9	16	18			
Undetermined	1	3	1	1	2	4			
TOTAL	73	59	13	35	86	94			
<u>Other</u>									
Track Related	4	4	4	5	8	9			
Equipment Related	4	2	-	1	4	3			
Operations Related	-	-	1	4	1	4			
Other	4	3	4	6	8	9			
Undetermined	-	-	-	-	-	-			
TOTAL	12	9	9	16	21	25			
<hr/> <hr/>									
			<u>%</u>		<u>%</u>	<u>%</u>			
<u>All Railways</u>			<u>Change</u>		<u>Change</u>	<u>Change</u>			
Track Related	88	69	-21.6	14	31	121.4	102	100	-2.0
Equipment Related	65	64	-1.5	-	4		65	68	4.6
Operations Related	26	17	-34.6	23	40	73.9	49	57	16.3
Other	33	23	-30.3	21	26	23.8	54	49	-9.3
Undetermined	1	3		2	1		3	4	
TOTAL	213	176	-17.4	60	102	70.0	273	278	1.8

3.4 DERAILMENTS BY DETAILED CAUSE (1981-85)

<u>Assessed Cause</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Snow, ice, mud	4	10	8	6	18
Slides, unstable slopes, subsidence	10	14	5	6	6
Washouts, floods	5	4	2	3	3
Track failure - rail buckle	16	9	14	11	6
Track failure - rail rollover	9	17	8	5	3
Track failure - gage restraint	10	9	13	16	4
Track failure - rail or joint broken	30	26	21	22	26
Track failure - type unidentified	3	0	1	1	3
Track geometry	25	23	19	22	20
Turnout component defect	12	10	9	10	11
Total Track Related	<u>124</u>	<u>122</u>	<u>100</u>	<u>102</u>	<u>100</u>
Loose wheels	2	2	1	1	2
Broken wheels	9	10	10	9	11
Broken axles	4	4	10	7	3
Journal failures - roller bearings	21	15	17	22	19
Journal failures - friction bearings	32	14	9	8	7
Truck component defect	12	9	5	4	9
Brake gear defective or dragging	6	6	4	5	11
Draft gear failure	7	9	8	5	2
Other rolling stock defects	9	10	7	4	4
Total Equipment Related	<u>102</u>	<u>79</u>	<u>71</u>	<u>65</u>	<u>68</u>
Rule violations	36	37	25	31	35
Other employee failure	21	18	12	10	15
Traincontrol or marshalling	15	10	10	8	7
Total Operations Related	<u>72</u>	<u>65</u>	<u>47</u>	<u>49</u>	<u>57</u>
Loading defects	10	8	13	12	16
Vandalism and non-company error	19	27	5	18	8
Combination - track, equip., operational	18	17	17	24	25
Undetermined	3	9	1	3	4
Total Miscellaneous Cases	<u>50</u>	<u>61</u>	<u>36</u>	<u>57</u>	<u>53</u>
Total Derailments	348	327	254	273	278

3.5 NUMBER OF DERAILMENTS (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984*</u>	<u>1985*</u>
<u>CN</u>								
Main Track Trains	181	232	186	204	176	139	128	108
Yard Movements	<u>7</u>	<u>7</u>	<u>23</u>	<u>32</u>	<u>20</u>	<u>30</u>	<u>38</u>	<u>51</u>
TOTAL	188	239	209	236	196	169	166	159
<u>CP</u>								
Main Track Trains	84	90	70	82	89	55	73	59
Yard Movements	<u>2</u>	<u>2</u>	<u>2</u>	<u>13</u>	<u>22</u>	<u>9</u>	<u>13</u>	<u>35</u>
TOTAL	86	92	72	95	111	64	86	94
<u>Other</u>								
Main Track Trains	20	6	9	11	8	8	12	9
Yard Movements	<u>1</u>	<u>2</u>	<u>2</u>	<u>6</u>	<u>12</u>	<u>13</u>	<u>9</u>	<u>16</u>
TOTAL	21	8	11	17	20	21	21	25
<u>All Railways</u>								
Main Track Trains	285	328	265	297	273	202	213	176
Yard Movements	<u>10</u>	<u>11</u>	<u>27</u>	<u>51</u>	<u>54</u>	<u>52</u>	<u>60</u>	<u>102</u>
TOTAL	295	339	292	348	327	254	273	278

3.6 DERAILMENT CASUALTIES (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Fatalities</u>								
CN	2	-	-	-	-	-	-	1
CP	-	1	-	-	-	-	1	-
Other	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
All Railways	2	1	-	-	-	-	1	1
<u>Injuries</u>								
CN	25	40	77	83	46	31	14	12
CP	2	33	25	8	49	4	13	7
Other	4	-	1	1	-	7	-	3
	-	-	-	-	-	-	-	-
All Railways	31	73	103	92	95	42	27	22

3.7 MAIN TRACK TRAIN DERAILMENTS PER BILLIONS OF FREIGHT GROSS TON-MILES
(FREIGHT BGTM) (1978-1985)

<u>CN</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Total Derailments	188	239	209	236	196	169	166	159
Main Track Train Derailments	181	232	186	204	176	139	128	108
Freight BGTM	147.2	155.4	161.0	159.3	139.6	157.7	174.7	166.4
Main Track Train Derailments Per Freight BGTM	1.23	1.49	1.16	1.28	1.26	0.88	0.73	0.65
<u>CP</u>								
Total Derailments	86	92	72	95	111	64	86	94
Main Track Train Derailments	84	90	70	82	89	55	73	59
Freight BGTM	110.8	114.7	114.0	119.3	112.8	119.6	127.9	120.9
Main Track Train Derailments Per Freight BGTM	0.76	0.78	0.61	0.69	0.79	0.46	0.57	0.49
<u>Other</u>								
Total Derailments	21	8	11	17	20	21	21	25
Main Track Train Derailments	20	6	9	11	8	8	12	9
Freight BGTM	27.3	37.8	33.5	30.6	23.1	21.3	18.4	17.7*
Main Track Train Derailments Per Freight BGTM	0.73	0.16	0.27	0.36	0.35	0.38	0.65	0.51*
<u>11 Railways</u>								
Total Derailments	295	339	292	348	327	254	273	278
Main Track Train Derailments	285	328	265	297	273	202	213	176
Freight BGTM	285.2	307.9	308.5	309.2	275.6	298.5	321.0	305.0*
Main Track Train Derailments Per Freight BGTM	1.00	1.07	0.86	0.96	0.99	0.68	0.66	0.58*

Estimated

3.8 DERAILMENTS BY NUMBER OF CARS AND/OR ENGINES DERAILED 1984-1985

No. of Cars and/or Engines Derailed	1984 Derailments		1985 Derailments	
	Main Track	Yard	Main Track	Yard
1	73	28	77	45
2	29	17	17	23
3	15	7	16	17
4	14	3	6	8
5	10	3	6	3
6	9	-	7	1
7	8	-	6	1
8	9	1	6	1
9	6	-	3	-
10	4	-	1	2
11-15	14	1	13	1
Over 15	<u>22</u>	<u>-</u>	<u>18</u>	<u>-</u>
TOTAL	213	60	176	102

3.9 DERAILMENTS AND CASUALTIES BY PROVINCE (1984-1985)

	<u>1984</u>			<u>1985</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	7	-	-	12	-	-
Prince Edward Island	-	-	-	-	-	-
Nova Scotia	6	-	-	6	-	-
New Brunswick	15	-	-	9	-	2
Quebec	36	-	2	31	-	-
Ontario	67	-	3	84	-	8
Manitoba	11	-	3	15	-	2
Saskatchewan	24	-	5	26	-	5
Alberta	38	1	8	40	1	5
British Columbia	69	-	6	55	-	-
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	-	-	-
 CANADA	 273	 1	 27	 278	 1	 22

SECTION 4 Crossing Accidents

SECTION 4

CROSSING ACCIDENTS

Accidents

A crossing accident is one where any unit of rolling stock on the rails strikes or is struck by a user of a public, private or farm crossing, and damage or injury results. All accidents at public crossings are reportable, private or farm crossings being reportable only if they involve a casualty.

There were a total of 605 crossing accidents reported to the Canadian Transport Commission in 1985, a slight increase of 1.5% over the 1984 figure. Annual crossing accident totals during the 1978-83 period show a steady downward trend after which the figures appear to have levelled off during the past two years (Fig. 4.1). The majority of all reportable crossing accidents occur at public crossings. There were 567 such accidents in 1985, with accidents at protected public crossings slightly outnumbering those at unprotected public crossings. This is in contrast to the actual number of public highway/railway grade crossings in Canada; in 1985 unprotected public crossings outnumbered those with protections by a ratio of 10:3 (Fig. 4.2). However, protected crossings have much greater train and vehicular traffic than unprotected crossings and this produces greater accident risk. Table 4.2 is a breakdown of crossing accidents by protection type.

The provinces of Ontario, Quebec and Alberta together accounted for over two-thirds of the 567 public crossing accidents in 1985. These three provinces also accounted for almost half of the same 27,200 public highway/railway grade crossings in Canada. The number of accidents at public crossings is shown by province in Fig. 4.3(a). There were approximately two accidents for every 100 crossings in Canada as a whole. Quebec, B.C. and Ontario had values well above the national average whereas accident ratios for the Atlantic and the Prairie provinces were either similar or well below the value for Canada.

In 1985, unprotected crossings accounted for 72% of the total public crossings in Canada. The accident ratios with respect to protected and unprotected public crossings are shown in Fig. 4.3(b). The values for Canada were 3.7 and 1.4 accidents respectively for every 100 crossings. However, unprotected crossings are not used as frequently as protected crossings. Looking at the accident ratios at protected crossings therefore, as a better indicator of relative safety performance, Manitoba had the best record in 1985 followed by the Atlantic provinces. Ontario's record was superior or comparable to the other provinces even though it accounts for the largest number of protected crossings in Canada.

The winter period is the most critical for crossing accidents owing to the unpredictable driving conditions. The months of January, February and December accounted for over one-third of all crossing accidents in 1985. The fluctuation in crossing accidents by time of year is shown in Fig. 4.4. The graph indicates minor peaks during certain summer/fall months, presumably because of the increased volume of holiday traffic.

Daytime accounts for two out of every three crossing accidents. Fig. 4.5, which shows the variation in crossing accidents by time of day, indicates a higher probability for an accident occurring during the mid-day hours owing to the large volume of commercial and private motor-vehicle traffic during this time period. Accidents appear to taper off by mid-afternoon after which the 'after-office' rush hour accounts for another very high peak in crossing accidents. The morning rush hour is not as critical since drivers are presumably more alert at this time. Accidents during the late evening hours may be attributable to factors such as fatigue and alcohol consumption. The numbers are fairly constant during these hours and there is a minor peak around midnight/1.00 a.m. at which time late night businesses close; accidents then drastically drop in number until the morning.

Crossing accidents in which a train strikes the vehicle outnumber those accidents where the vehicle strikes the train by 3 to 2. Part of the explanation lies in the fact that motor vehicle drivers are apt to be impatient and rather than wait for the approaching train, they may be tempted to take chances when a crossing is clear of rolling stock. Fig. 4.6 is a graphical representation of 1985 public crossing accidents by impact type. The figure illustrates the percentage breakdown of impact type by day and night, and then takes the breakdown one step further by subdividing the above accidents into those that occurred at protected and unprotected crossings.

Some 84% of the rolling stock involved in crossing accidents were freight movements. Passenger trains accounted for another 14% and the rest involved movements of track motor cars and maintenance of way equipment. In terms of train-mile performance, freight movements normally account for four times the volume of passenger traffic. Crossing accidents by vehicle type are presented in Table 4.2. Approximately one-fourth of all vehicle registrations are trucks and buses (75% being passenger automobiles) and yet nearly one-third of all crossing accidents involved trucks..

The risk of dangerous commodities (D.C.) being involved in a crossing accident is considerably less than that in a collision or derailment. Over the years, D.C. related crossing accidents have always amounted to less than 2% of the total reportable crossing accident totals. Crossing accidents also generally do not result in a derailment of rolling stock. There were nine such cases in 1985 as compared to 12 in 1984.

There were 42 crossing accidents per million motor vehicle registrations in 1985 as compared to a figure of 41 in 1984. The ratio of crossing accidents per million train-miles was 7.66 in 1985 versus a figure of 7.33 a year ago. Crossing accident rates appear to have levelled off after the fairly high values recorded during the 1978-82 period. A breakdown of 1985 crossing accidents by type of rail traffic gives the following: there were 5.69 crossing accidents involving passenger trains per million passenger train-miles; the corresponding figure for accidents involving freight trains per million freight train-miles was 7.95.

Casualties

Figure 4.7 points out an interesting fact: the majority of crossing accidents do not result in casualties. In 1985, 34% of all crossing accidents resulted in injuries while only 8% resulted in fatalities. In each of the years 1983, 1984 and 1985 there were 50 fatality related crossing accidents, and these resulted in 59, 70 and 58 annual fatalities respectively. Fig. 4.8 shows the frequency distribution for crossing fatalities and the accidents causing them. For example in 1985, there were 42 single fatality accidents and 6 accidents with 2 fatalities each; in 1984, however, there were 39 single fatality accidents, 6 accidents with 2 fatalities each, 4 accidents with 3 fatalities and 1 with 6 fatalities. Although total fatalities decreased by some 16% in 1985 from the previous year, the very high figure in 1984 was due to the multiple fatality accidents as illustrated above.

Although crossing accidents account for nearly half of all railway related fatalities, it is not railway employees or passengers who are killed. In 1985, motor vehicle occupants accounted for 90% of all crossing fatalities, the remainder being mainly pedestrians. Motor vehicle occupants also accounted for some 78% of total injuries at railway crossings. Although crossing injuries increased from 289 in 1984 to 336 in 1985, this was mainly due to a large rise in railway passenger injuries. These were almost entirely the result of four crossing accidents involving passenger trains: the first was on February 15 at Glen Robertson, Ontario when an RDC struck a milk truck stalled on a crossing; the second occurred on July 24 at Penhold, Alberta when an RDC struck a tractor-trailer (with two trailers) which had stopped foul of the crossing; the third was on September 20 at Coteau, Quebec where an LRC struck a tractor-trailer; and the fourth occurred on October 23 at Duncan, B.C. when an RDC struck a tractor-trailer. Together, these four accidents accounted for 2 fatalities and 54 injuries. Of these injuries, 49 were to railway passengers.

Fig. 4.1
1978 - 85

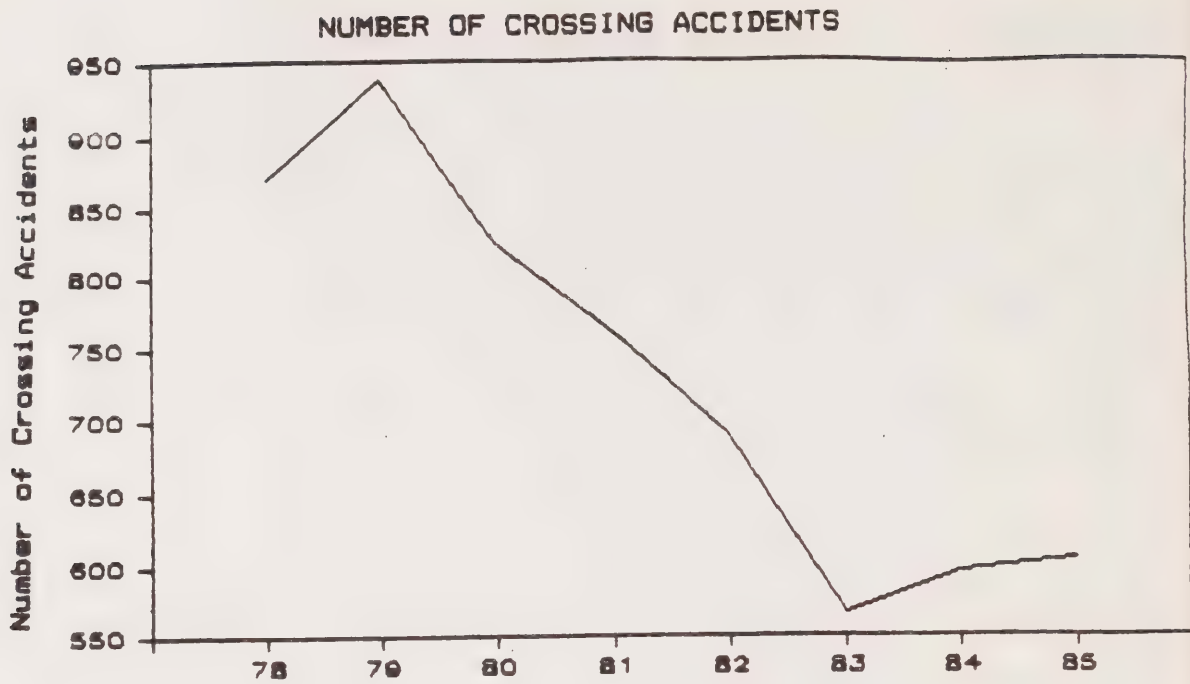


Fig. 4.2
1983 - 85

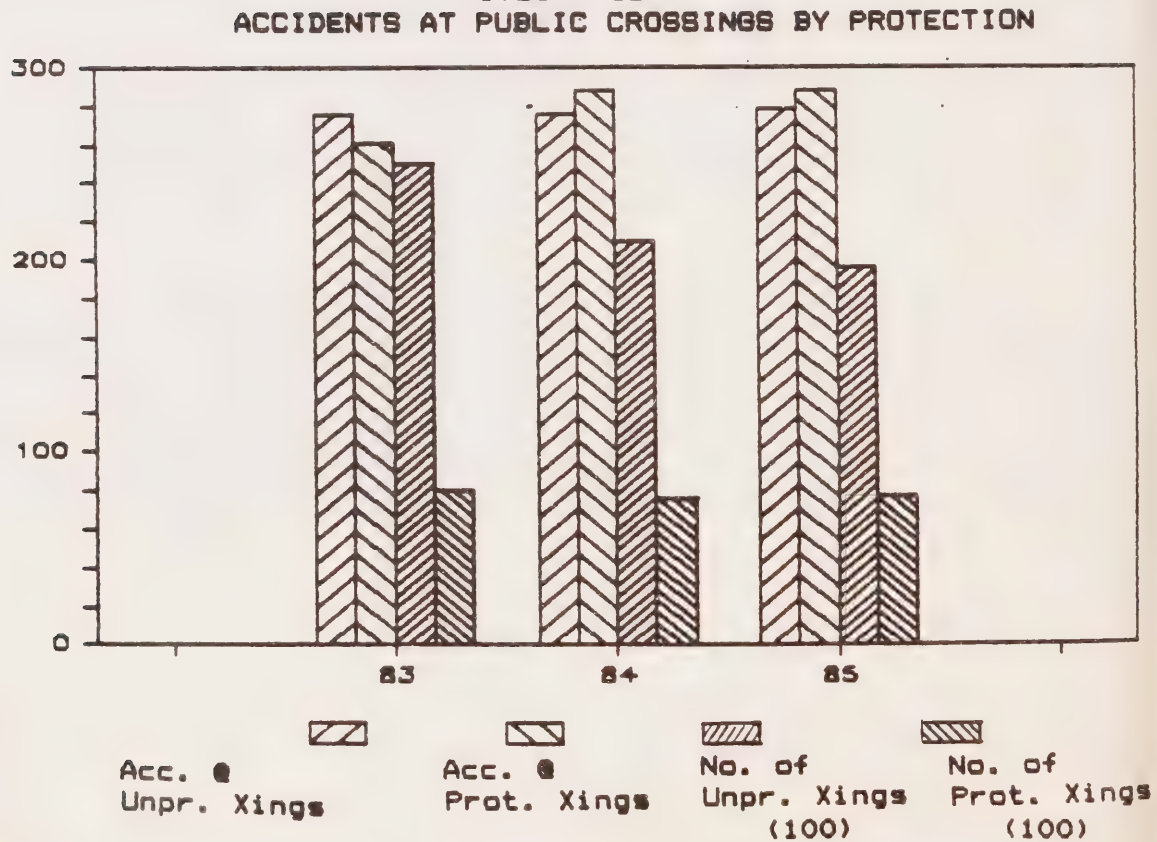


Fig. 4.3(a)
1985

TOTAL PUBLIC XING ACCIDENTS/TOTAL NO.OF PUBLIC XINGS

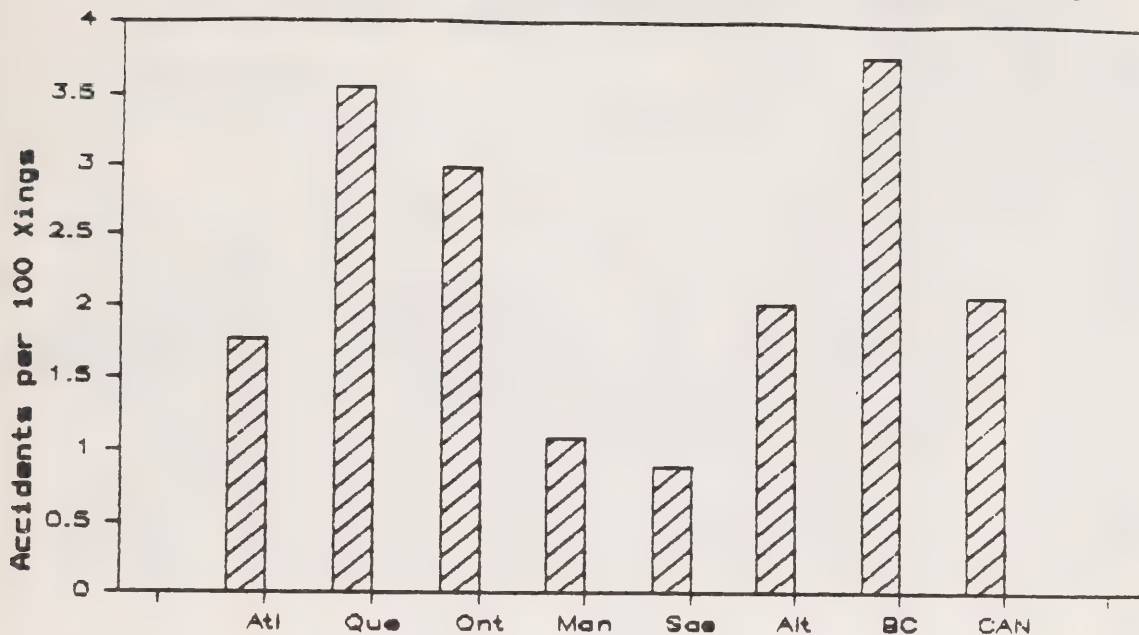


Fig. 4.3(b)
1985

PROT. PUBLIC XING ACC/NO. OF PROT. PUBLIC XINGS &
UNPRO. PUBLIC XING ACC/NO. OF UNPRO. PUBLIC XINGS

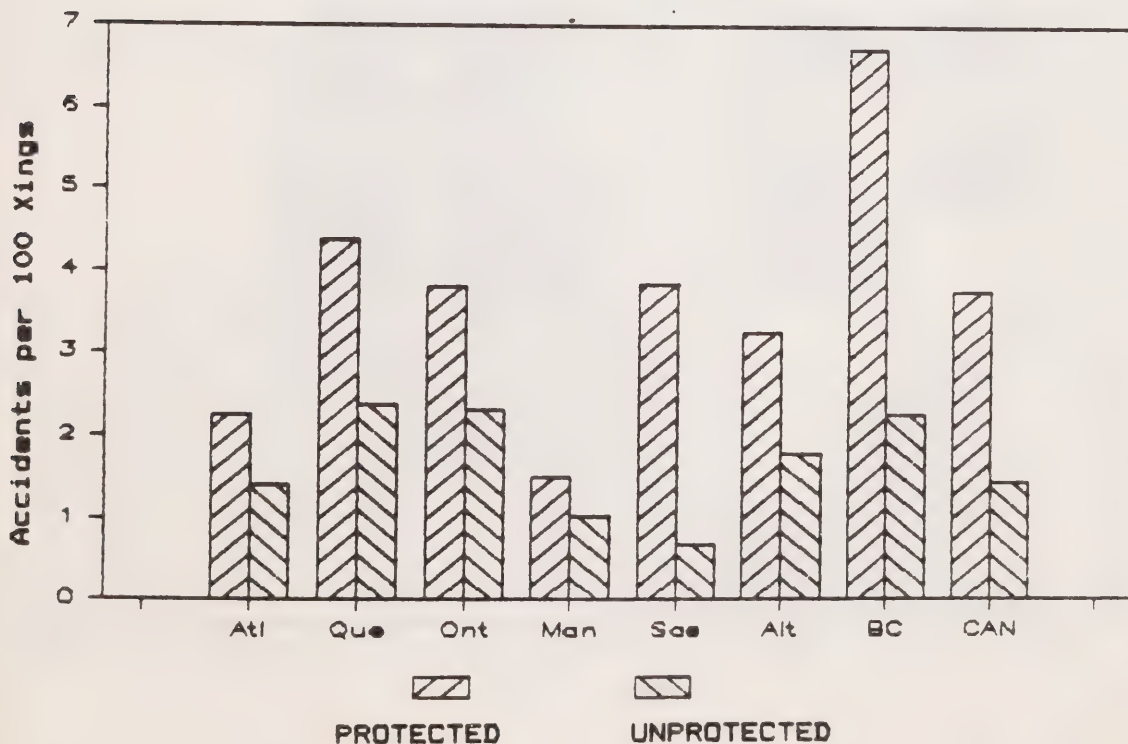


Fig. 4.4
1984 - 85

TOTAL CROSSING ACCIDENTS BY MONTH

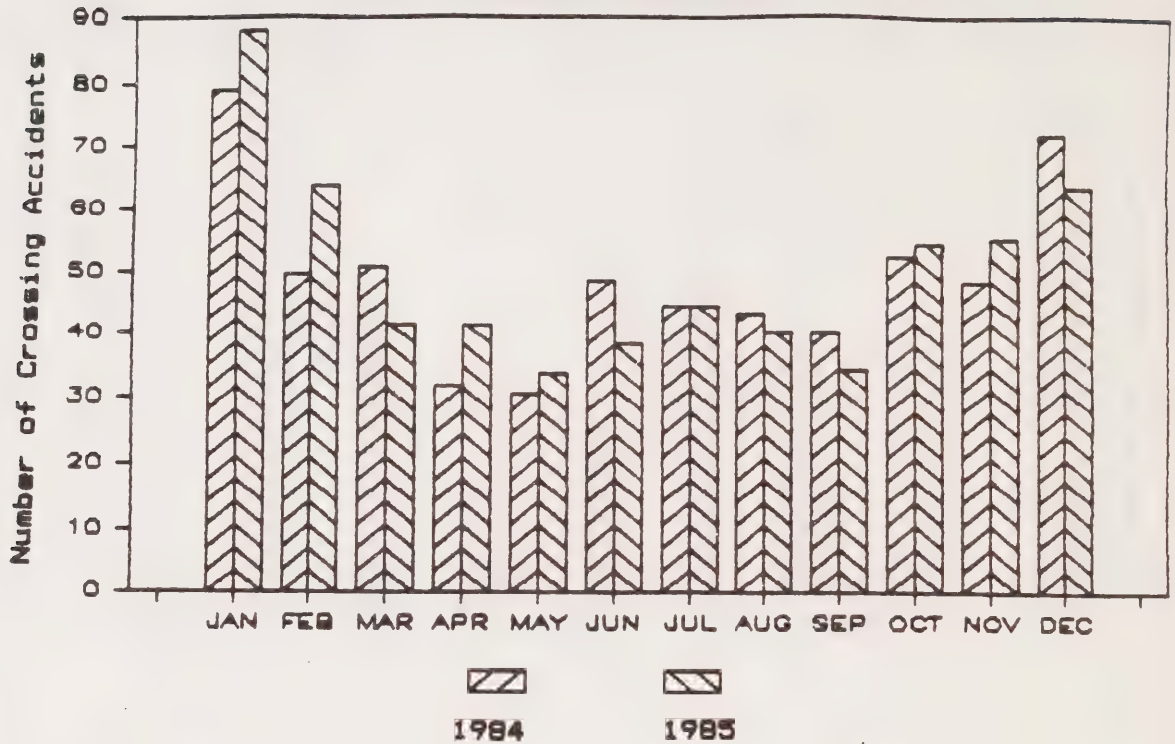


Fig. 4.5
1984 - 85

AVERAGE NO. OF CROSSING
ACCIDENTS BY TIME OF DAY

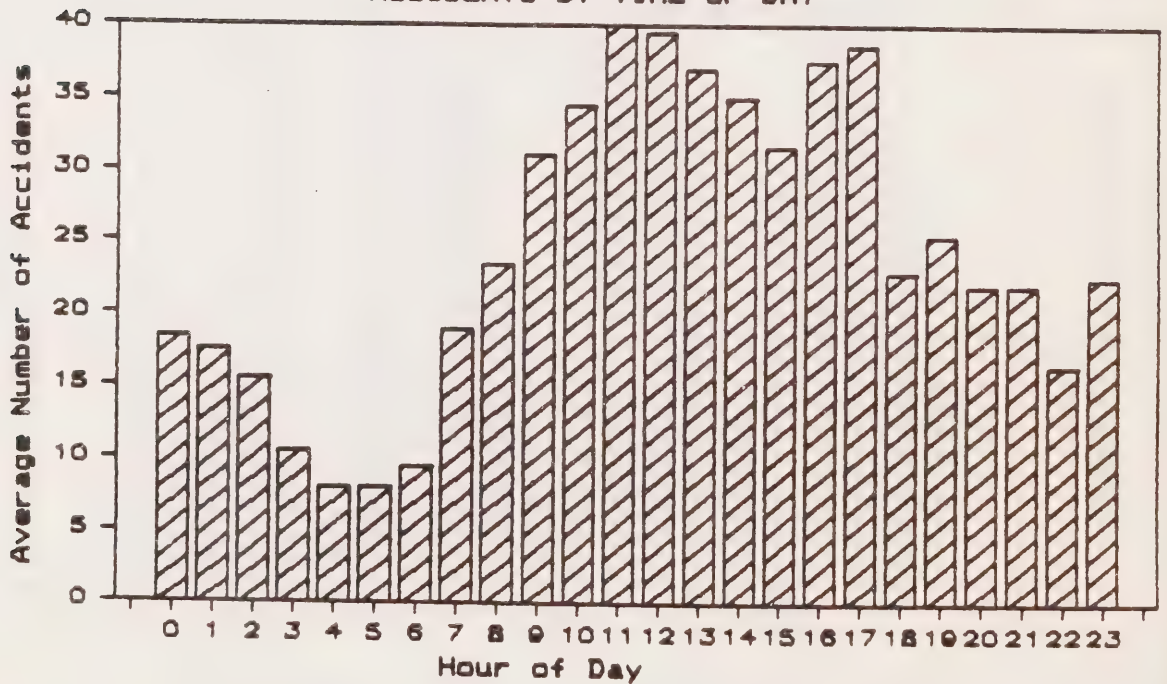
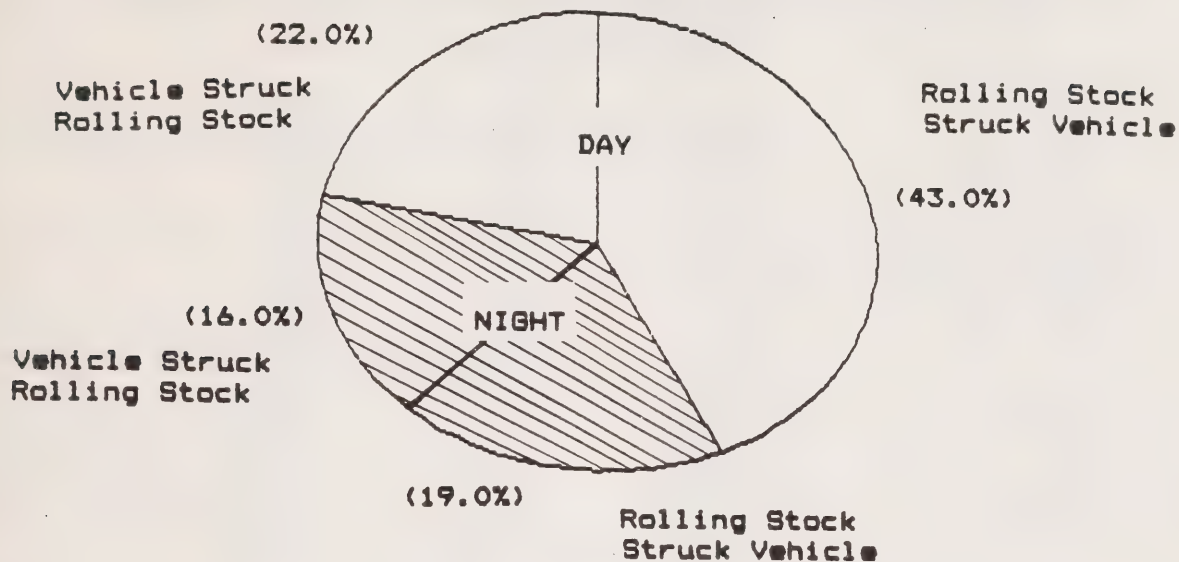


Fig. 4.6
PUBLIC CROSSING ACCIDENTS BY IMPACT - 1985



357
Public Crossing Accidents for which
Time of Occurrence Available

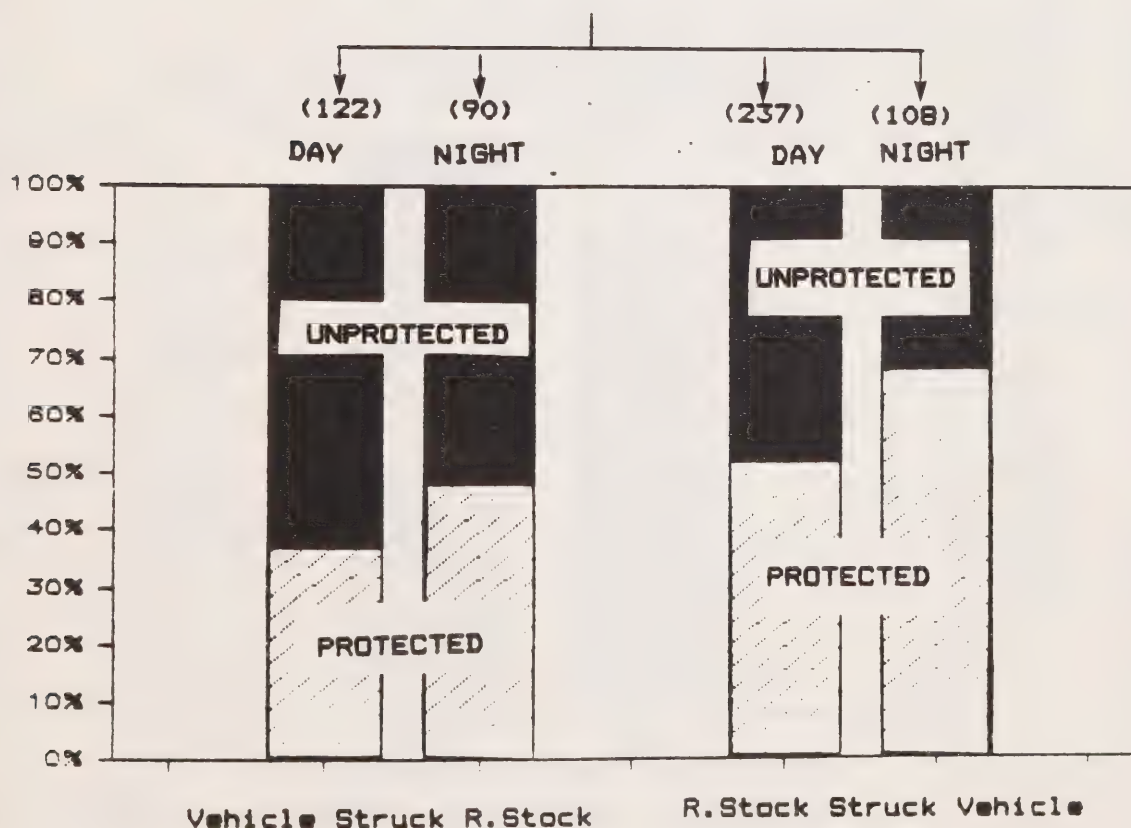


Fig. 4.7
1983 - 85
TOTAL XING & CASUALTY XING ACCIDENTS

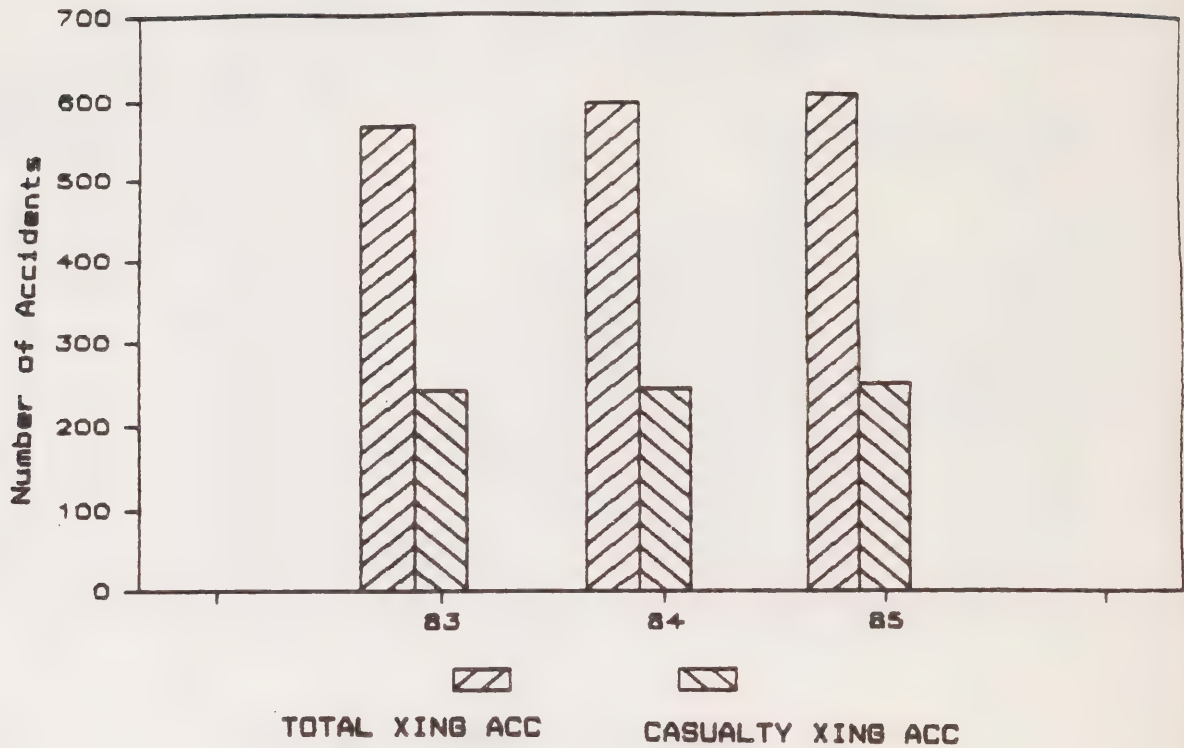
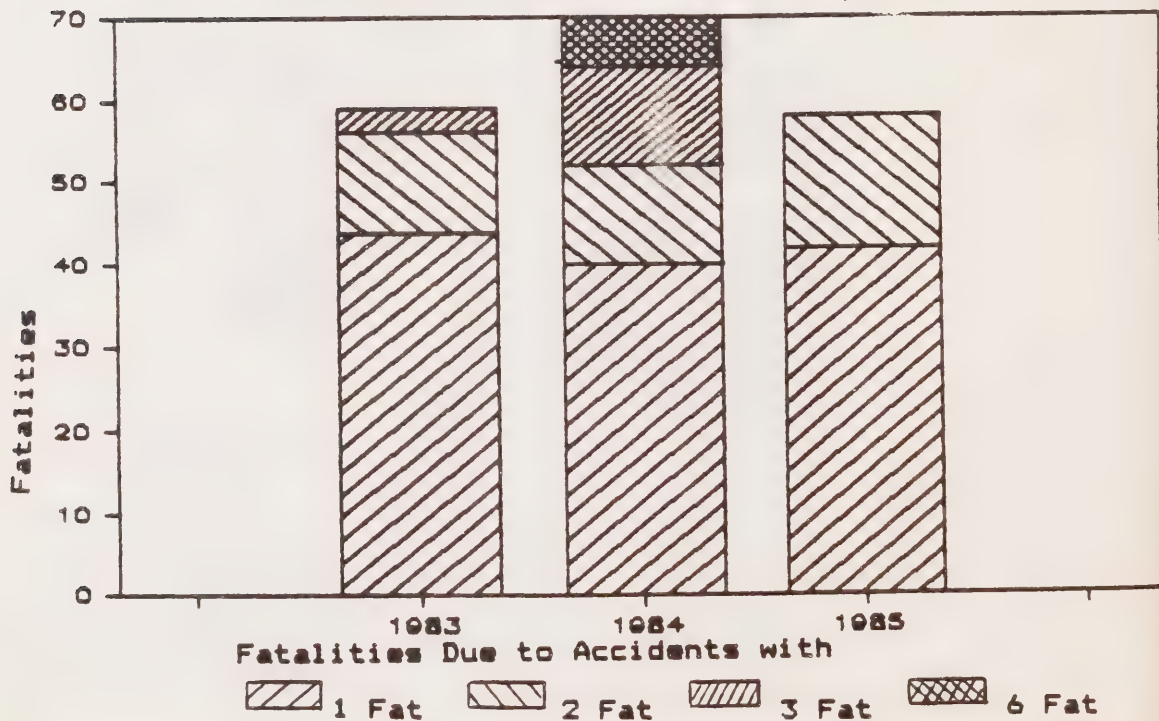


Fig. 4.8
1983 - 85
FREQUENCY DISTRIBUTION OF
FATALITIES & XING ACC. CAUSING THEM



SECTION 4

CROSSING ACCIDENTS

4.1 CROSSING ACCIDENTS BY RAILWAY (1985 Summary)

	<u>CN</u>	<u>CP</u>	<u>OTHER</u>	<u>ALL RAILWAYS TOTAL</u>	<u>%</u>
<u>Crossing Accidents by Type of Crossing</u>					
Protected	166	101	9	286	48
Unprotected	143	121	17	281	46
Farm Crossing	4	3	-	7	1
Private Crossing	<u>23</u>	<u>7</u>	<u>1</u>	<u>31</u>	<u>5</u>
TOTAL	336	232	37	605	100

Crossing Accidents by Province

Nfld.	3	-	1	4	1
PEI	3	-	-	3	1
NS	10	2	5	17	3
NB	13	4	-	17	3
Que.	80	38	2	120	20
Ont.	111	64	24	199	32
Man.	25	12	1	38	6
Sask.	32	35	-	67	11
Alta.	36	48	-	84	14
BC	22	29	4	55	9
Yukon	-	-	-	-	-
N.W.T.	<u>1</u>	<u>-</u>	<u>-</u>	<u>1</u>	<u>-</u>
TOTAL	336	232	37	605	100

Crossing Accidents by Time of Year

January, February and December	125	78	13	216	34
March - November	<u>211</u>	<u>154</u>	<u>24</u>	<u>389</u>	<u>66</u>
TOTAL	336	232	37	605	100

4.1 CROSSING ACCIDENTS BY RAILWAY (1985 Summary Cont'd)

	<u>CN</u>	<u>CP</u>	<u>OTHER</u>	<u>ALL RAILWAYS TOTAL</u>	<u>%</u>
<u>Crossing Accidents by Time of Day</u>					
Day	213	159	17	389	65
Night	120	69	18	207	35
Unknown	<u>3</u>	<u>4</u>	<u>2</u>	<u>9</u>	
TOTAL	336	232	37	605	100
<u>Crossing Accidents by Type of Collision</u>					
Train Struck Vehicle	218	146	21	385	64
Vehicle Struck Train	<u>118</u>	<u>86</u>	<u>16</u>	<u>220</u>	<u>36</u>
TOTAL	336	232	37	605	100
<u>Crossing Accidents by Type of Rolling Stock</u>					
Passenger	46	9	-	55	9
Rail Diesel Car	16	14	-	30	5
Freight	259	202	35	496	82
Plow	9	4	-	13	2
Track Motor Car	3	3	2	8	1
Maintenance of Way Equipment	<u>3</u>	<u>-</u>	<u>-</u>	<u>3</u>	<u>1</u>
TOTAL	336	232	37	605	100
<u>Crossing Accidents by Type of Casualty</u>					
Resulting in Injury	111	80	11	202	34
Resulting in Fatality	34	14	2	50	8
Non-Casualty	<u>191</u>	<u>138</u>	<u>25</u>	<u>353</u>	<u>58</u>
TOTAL	336	232	37	605	100

*Percentages based on the 596 accidents for which the time of occurrence was available.

4.2 CROSSING ACCIDENTS BY PROTECTION 1983-85.

<u>Type of Crossing</u>	<u>Accidents</u>			<u>Crossings</u>
	1983	1984	1985	1985
Public Crossings				
Reflectorized Crossing Signs	264	274	272	17,991
Other Unprotected	9	4	9	1,549
Flashing Lights and Bells	226	255	233	6,562
Gates	32	26	50	1,084
Other Protected	5	4	3	38
Total	<u>536</u>	<u>563</u>	<u>567</u>	<u>27,224</u>
Private Crossings	27	27	31	
Farm Crossings	<u>4</u>	<u>6</u>	<u>7</u>	
Total Crossings	567	596	605	

4.3 CROSSING ACCIDENTS BY TYPE OF VEHICLE (1985)

	Accidents: Rolling Stock Striking Vehicle		Accidents: Vehicle Striking Rolling Stock		Accidents: All		Motor Vehicle Registrat
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>%</u>
Passenger automobiles	238	62	148	67	386	63	75
Trucks & buses	129	33	65	30	194	32	22
Motorcycles, bicycles	7	2	6	3	13	2	3
Pedestrians, other persons	<u>11</u>	<u>3</u>	<u>1</u>	<u>-</u>	<u>17</u>	<u>3</u>	<u>-</u>
Total	385	100	220	100	605	100	100

*Based on figures for 1984.

4.4 CROSSING ACCIDENTS (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Casualty Accidents</u>								
Public Crossings	298	350	318	287	240	214	215	214
Private Crossings	42	19	37	29	32	27	27	31
Farm Crossings	<u>10</u>	<u>7</u>	<u>12</u>	<u>11</u>	<u>9</u>	<u>4</u>	<u>6</u>	<u>7</u>
TOTAL	350	412	367	327	281	245	248	252
<u>Non-Casualty Accidents</u>								
Public Crossings	521	525	459	436	410	322	348	353
Private Crossings	-	-	-	-	-	-	-	-
Farm Crossings	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	521	525	459	436	410	322	348	353
<u>All Accidents</u>								
Public Crossings	819	875	777	723	650	536	563	567
Private Crossings	42	55	37	29	32	27	27	31
Farm Crossings	<u>10</u>	<u>7</u>	<u>12</u>	<u>11</u>	<u>9</u>	<u>4</u>	<u>6</u>	<u>7</u>
TOTAL	871	937	826	763	691	567	596	605

4.5 CROSSING CASUALTIES (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Fatalities</u>								
Motor Vehicle Occupants	87	90	70	78	72	55	67	52
Railway Employees	2	-	1	1	1	-	2*	1
Railway Passengers	-	-	-	-	-	-	-	-
Pedestrians	-	8	12	3	4	4	1	5
TOTAL	89	98	83	82	77	59	70	58

<u>Injuries</u>								
Motor Vehicle Occupants	374	402	341	355	290	244	255	261
Railway Employees	35	39	40	42	30	30	20	17
Railway Passengers	6	3	45	51	34	5	7	51
Pedestrians	-	8	9	3	3	7	7	7
TOTAL	415	452	435	451	357	286	289	336

*Includes 1 contractor

4.6 CASUALTIES BY CROSSING PROTECTION 1983-85

<u>Type of Crossing</u>	<u>Injuries</u>			<u>Fatalities</u>		
	1983	1984	1985	1983	1984	1985
Public Crossings						
Reflectorized Crossing Signs	104	112	134	32	28	19
Other Unprotected	1	1	8	-	3	-
Flashing Lights and Bells	131	128	112	17	30	26
Gates	14	11	18	3	-	6
Other Protected	<u>2</u>	<u>2</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>1</u>
TOTAL	252	254	273	52	61	52
Private Crossings	27	28	45	6	7	5
Farm Crossings	<u>7</u>	<u>7</u>	<u>18</u>	<u>1</u>	<u>2</u>	<u>1</u>
Total Crossings	286	289	336	59	70	58

4.7 CROSSING ACCIDENTS: MISCELLANEOUS RATIOS (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
Total Accidents	871	937	826	763	691	567	596	
Cases with Derailment	17	19	20	13	11	18	12	
%	2.0	2.0	2.4	1.7	1.6	3.2	2.0	
Cases with D.C.	-	2	11	4	8	9	10	
%	-	0.2	1.3	0.5	1.2	1.6	1.7	
Millions of Motor Vehicle Registrations (MMVR)	13.0	13.3	13.7	13.9	14.3	14.6	14.4	
Crossing Acc./MMVR	67	70	60	55	48	39	41	
Million Train-Miles (MTM)	89.7	91.6	89.2	85.8	73.9	76.0	81.3	
Crossing Acc./MTM	9.71	10.23	9.26	8.89	9.35	7.46	7.33	

*Estimated

4.8 CROSSING ACCIDENTS AND CASUALTIES BY PROVINCE (1984-1985)

	1984			1985		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	2	-	-	4	2	-
Prince Edward Island	5	-	10	3	-	1
Nova Scotia	17	-	10	17	-	13
New Brunswick	16	-	10	17	2	9
Quebec	122	20	63	120	19	63
Ontario	195	25	92	199	18	98
Manitoba	43	9	22	38	1	21
Saskatchewan	61	5	19	67	7	28
Alberta	89	7	44	84	9	65
British Columbia	46	4	19	55	-	38
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	1	-	-
CANADA	596	70	289	605	58	336

**SECTION 5 Track Motor Car and Maintenance of
Way Equipment Collisions/Derailments**

SECTION 5

TRACK MOTOR CAR AND MAINTENANCE OF WAY EQUIPMENT COLLISIONS/DERAILMENTS

Accidents

This section tabulates collisions/derailments involving on-track work equipment such as track motor cars and maintenance of way equipment.

Collisions between or involving such equipment numbered 27 in 1985, a decrease of 3.6% from 1984.

There were 11 on-track equipment derailments in 1985, a sharp decline of 35.3% from the total in 1984. The majority of these derailments involved track motor cars.

Casualties

In 1985, on-track equipment collisions/derailments resulted in 2 fatalities and 50 injuries. Collisions accounted for the 2 fatalities and 70% of the injuries. In 1984, these type of collision/derailments did not result in any fatalities. However, they did account for 57 injuries.

SECTION 5

TRACK MOTOR CAR (TMC) AND MAINTENANCE OF WAY EQUIPMENT (MWE)
COLLISIONS/DERAILMENTS

5.1 NUMBER OF COLLISIONS AND CASUALTIES (1984 and 1985 SUMMARY)

	<u>Collisions</u>		<u>Casualties*</u>			
	<u>1984</u>	<u>1985</u>	<u>Injured</u>		<u>Killed</u>	
			<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
<u>TMC-TMC, TMC-MWE and MWE-MWE</u>						
CN	6	3	21	8	-	-
CP	2	4	6	20	-	-
Other	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	9	7	27	28	-	-
 <u>TMC-Train and MWE-Train</u>						
CN	11	13	3	4	-	-
CP	7	7	7	3	-	-
Other	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	19	20	10	7	-	-
	 <u>%</u> <u>Change</u>					
<u>TOTAL All Types</u>						
CN	17	16	-5.9	24	12	-
CP	9	11	22.2	13	23	-
Other	<u>2</u>	<u>-</u>	<u>-100.0</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	28	27	-3.6	37	35	-

*All Casualties are employees.

5.2 TOTAL OF ALL TMC AND MWE: COLLISIONS AND CASUALTIES (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Collisions</u>								
CN	32	22	25	34	30	21	17	16
CP	12	9	16	16	12	14	9	11
Other	<u>6</u>	<u>5</u>	<u>8</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>-</u>
TOTAL	50	36	49	53	43	36	28	27
<u>Casualties</u>								
<u>Fatalities</u>								
CN	-	-	1	-	4	-	-	1
CP	1	-	1	1	-	-	-	1
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	1	-	2	1	4	-	-	2
<u>Injuries</u>								
CN	50	30	25	65	22	30	24	12
CP	10	19	18	14	8	18	13	23
Other	<u>5</u>	<u>8</u>	<u>17</u>	<u>4</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	65	57	60	83	30	48	37	35

5.3 NUMBER OF DERAILMENTS AND CASUALTIES (1984 and 1985 Summary)

	<u>Derailments</u>		<u>Casualties*</u>			
	<u>1984</u>	<u>1985</u>	<u>Injuries</u>		<u>Fatalities</u>	
			<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
<u>TMC</u>						
CN	2	2	2	3	-	-
CP	10	8	15	11	-	-
Other	-	-	-	-	-	-
TOTAL	12	10	17	14	-	-

<u>MWE</u>						
CN	3	-	1	-	-	-
CP	2	1	2	1	-	-
Other	-	-	-	-	-	-
TOTAL	5	1	3	1	-	-

TOTAL All Types

			<u>% Change</u>				
CN	5	2	-60.0	3	3	-	-
CP	12	9	-25.0	17	12	-	-
Other	-	-	-	-	-	-	-
TOTAL	17	11	-35.3	20	15	-	-

*All casualties are employees.

5.4 TOTAL OF ALL TMC AND MWE: DERAILMENTS AND CASUALTIES (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Derailments</u>								
CN	12	19	6	2	4	3	5	9
CP	10	11	25	11	12	14	12	2
Other	<u>-</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	22	32	32	16	18	17	17	11
<u>Casualties</u>								
<u>Fatalities</u>								
CN	-	1	-	-	-	-	-	-
CP	-	-	-	-	-	1	-	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	-	1	-	1	-	1	-	-
<u>Injuries</u>								
CN	16	27	8	2	5	6	3	3
CP	13	14	31	12	20	20	17	12
Other	<u>-</u>	<u>7</u>	<u>1</u>	<u>3</u>	<u>6</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	29	48	40	17	31	26	20	15

5.5 TMC/MWE COLLISIONS-DERAILMENTS AND CASUALTIES BY PROVINCE (1984-1985)

	<u>1984</u>			<u>1985</u>		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	-	-	-	-	-	-
Prince Edward Island	-	-	-	-	-	-
Nova Scotia	-	-	-	-	-	-
New Brunswick	1	-	-	1	-	2
Quebec	2	-	1	3	1	6
Ontario	18	-	22	9	-	6
Manitoba	2	-	1	3	-	8
Saskatchewan	-	-	-	3	-	3
Alberta	8	-	10	4	1	4
British Columbia	14	-	23	15	-	21
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	-	-	-
CANADA	45	-	57	38	2	50

SECTION 6 Train Service Accidents

SECTION 6

TRAIN SERVICE ACCIDENTS

Accidents

Train Service Accidents from 1981 onwards, as shown in this report, represent persons (including trespassers) sustaining injuries or dying as a result of being struck by rolling stock or employees injured while in the process of entraining/detraining rolling stock.

In 1985, there were 531 such accidents and this was 7.2% lower than the figure in 1984. Three-fourths of these involved railway employees getting off/on rolling stock.

Casualties

Train Service Accidents accounted for 63 fatalities in 1985 (this was 48% of all railway accident fatalities). Most of these fatalities were trespassers and suicides. This relatively large number of deaths should not be ignored; however, it is difficult to to deter a determined trespasser or an individual determined to end his/her life on the railway. People intent on committing such acts can find ways of overcoming any railway preventative measures. Train Service Accident fatalities numbered 51 in 1984. This category of accidents also resulted in 475 injuries in 1985, as compared to 525 in 1984. The majority of these are injuries to employees getting off/on rolling stock.

SECTION 6

TRAIN SERVICE ACCIDENTS

6.1 TRAIN SERVICE ACCIDENTS AND CASUALTIES (1984 and 1985 Summary)

	<u>1984</u>	<u>1985</u>	<u>% Change</u>
<u>Accidents</u>			
Employees/Other struck by Rolling Stock	38	26	-31.6
Passengers struck by Rolling Stock	-	1	
Trespassers struck by Rolling Stock	101	107	5.9
Employees getting off/on Rolling Stock	<u>433</u>	<u>397</u>	<u>-8.3</u>
TOTAL	572	531	-7.2
<u>Casualties</u>			
i) <u>Fatalities</u>			
Employees struck by Rolling Stock*	8	3	-62.5
Passengers struck by Rolling Stock	-	-	
Trespassers struck by Rolling Stock	43	60	39.5
Employees getting off/on Rolling Stock	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	51	63	23.5
ii) <u>Injuries</u>			
Employees struck by Rolling Stock**	32	23	-28.1
Passengers struck by Rolling Stock	-	1	
Trespassers struck by Rolling Stock***	60	54	-10.0
Employees getting off/on Rolling Stock	<u>433</u>	<u>397</u>	<u>-8.3</u>
TOTAL	525	475	-9.5

* 1984 data includes 1 retired employee

** 1984 includes 1 non-employee, 1985 includes 2 non-employees

***1985 includes 3 employees injured in a trespasser accident

6.2 TRAIN SERVICE ACCIDENTS AND CASUALTIES (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Accidents</u>								
Employees/Other struck by Rolling Stock*	51	48	32	28	29	35	38	27
Trespassers struck by Rolling Stock	105	82	177	109	91	111	101	107
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>	<u>397</u>
TOTAL				729	614	703	572	531

Casualties

Fatalities

Employees struck by Rolling Stock*	5	5	6	4**	7	6	8**	3
Trespassers struck by Rolling Stock	54	51	97	58	50	47	43	60
Employees getting off/on Rolling Stock***	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL				62	57	53	51	63

Injuries

Employees struck by Rolling Stock*	29	46	25	24	22	30	32**	24**
Trespassers struck by Rolling Stock	51	34	80	46	40	65	60	54***
Employees getting off/on Rolling Stock****	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>	<u>397</u>
TOTAL				662	556	652	525	475

* These totals may include the rare case of a passenger being struck by rolling stock.

** Includes 1 non-employee accident in the years 1981 & 1984; 2 non-employee accidents in 1985

*** Includes 3 employees injured in a trespasser accident

****See footnote to Table 1.2.

6.3 TRESPASSERS/SUICIDES BY PROVINCE (1984-1985)

	1984			1985		
	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Accidents</u>	<u>Killed</u>	<u>Injured</u>
Newfoundland	-	-	-	1	-	1
Prince Edward Island	1	1	-	-	-	-
Nova Scotia	3	1	2	2	1	1
New Brunswick	-	-	-	4	3	1
Quebec	16	6	11	13	11	2
Ontario	38	18	20	47	30	19
Manitoba	4	2	2	6	2	7
Saskatchewan	5	2	3	2	2	-
Alberta	11	4	7	11	3	10
British Columbia	23	9	15	21	8	13
Yukon	-	-	-	-	-	-
North West Territories	-	-	-	-	-	-
CANADA	101	43	60	107	60	54

*Includes 3 employees injured in a trespasser accident

SECTION 7 Incidents

SECTION 7

INCIDENTS

Incidents

Incidents include fires, cases of dangerous commodity leakages (not always related to train movements) and other occurrences of a miscellaneous nature. Examples of the latter category include:

- personal injuries to employees or passengers such as striking against or being hit by an obstacle; burns; exposure; sprains, inhalation; etc.
- disruptions of service, washouts, obstructions to track, not resulting in a train accident.
- damage to bridges, culverts, other structures not due to train accidents but including fire damage.

There were 226 fires in 1985 which is a decrease of 11.9% from 1984. The majority of fires are on right of way and these in turn are dependent on climatic conditions and to a lesser degree on vandalism.

Dangerous commodity (D.C.) leakage incidents in this section are specifically those that arise in the transportation of dangerous commodities other than due to train accidents. The latter are already included in the figures presented in earlier sections of this report. D.C. leakages totalled 336 in 1985. The considerable increase in recent years relates mainly to more stringent inspection.

All other incidents amounted to 2,702 in 1985, compared to 2,564 in 1983. 96% of these incidents were miscellaneous injuries sustained by employees and passengers not related to train accidents.

Casualties

D.C. incidents accounted for only 7 injuries in 1985. The vast majority of the 2,611 miscellaneous incident injuries were due to "other incidents" as defined earlier. Some four-fifths of these "other incidents" were personal injuries to employees, with passenger injuries accounting for a further 19%. It should be pointed out that there is no minimum severity for reporting. Injuries can range from a loss of a limb to a minor slip or fall.

SECTION 7

INCIDENTS

7.1 INCIDENTS AND CASUALTIES (1984 and 1985 Summary)

	<u>Incidents</u>			<u>Fatalities</u>		<u>Injuries</u>
	<u>1984</u>	<u>1985</u>	<u>% Change</u>	<u>1984</u>	<u>1985</u>	<u>1984</u>
<u>Fires</u>						
Fires on Right of Way	178	200		-	-	-
Fires on Rolling Stock	17	16		-	-	3
Fires on Structures	<u>7</u>	<u>10</u>		<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	202	226	11.9	-	-	3
<u>Dangerous Commodity Incidents*</u>	418	336	-19.6	-	-	5
<u>Other Miscellaneous Incidents</u>						
Involving Employees only	2,060	2,088		-	1	2,072
Involving Passengers only	396	498		-	1	397
Other Incidents**	<u>108</u>	<u>116</u>		<u>2</u>	<u>5</u>	<u>25</u>
TOTAL	<u>2,564</u>	<u>2,702</u>	5.4	<u>2</u>	<u>7</u>	<u>2,494</u>
TOTAL INCIDENTS	3,214	3,264	1.6	2	7	2,502

* These totals relate to incidents involving the transportation of dangerous commodities other than in train accidents, many of these leakages being of a minor nature.

** 1984 data includes 2 non-employee injuries. All other casualties are employees.
1985 data includes 2 non-employee fatalities and 1 non-employee injury.

7.2 INCIDENTS AND CASUALTIES (1978-1985)

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Incidents</u>								
Fires	240	246	229	221	273	254	202	226
D.C.	47	51	107	157	105	288	418	336
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,564</u>	<u>2,702</u>
TOTAL				3,264	3,189	2,925	3,214	3,264
<u>Casualties</u>								
<u>Fatalities</u>								
Fires	-	-	-	-	-	-	-	-
D.C.	-	-	-	-	-	-	-	-
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>5</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>7</u>
TOTAL				5	8	6	2	7
<u>Injuries</u>								
Fires	-	-	-	3	6	5	3	-
D.C.	1	6	23	1	1	7	5	7
All Other*	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>2,861</u>	<u>2,743</u>	<u>2,282</u>	<u>2,494</u>	<u>2,604</u>
TOTAL				2,865	2,750	2,294	2,502	2,611

*See Footnotes to Table 1.2

SECTION 8 Serious Collisions and Derailments

SECTION 8

SERIOUS COLLISIONS AND DERAILMENTS

Sections 2 and 3 discussed train collisions and derailments in detail. Although there were 72 collisions and 278 derailments reported to the Canadian Transport Commission in 1985, it is easy to misinterpret these totals. From a purely arithmetical standpoint, one could restate the 1985 figures in the following manner: "Every day Canadian trains are involved in a collision or a derailment". Such a statement would create great concern, as immediately bringing to mind head-on collisions involving passenger trains and multi-car derailments involving the leakage of dangerous commodities (D.C.). Fortunately, such cases are rare. It has been pointed out in Sections 2 and 3 that the reporting criteria for collisions and derailments have a rather low minimum dollar threshold. It has also been indicated in these sections, that many of the above accidents reported to the Canadian Transport Commission are of a minor nature: they occur in yards during the course of switching/humping operations and are reportable even if the involved car is a D.C. "empty". In addition, over half of all train derailments involve the derailment of only one or two cars.

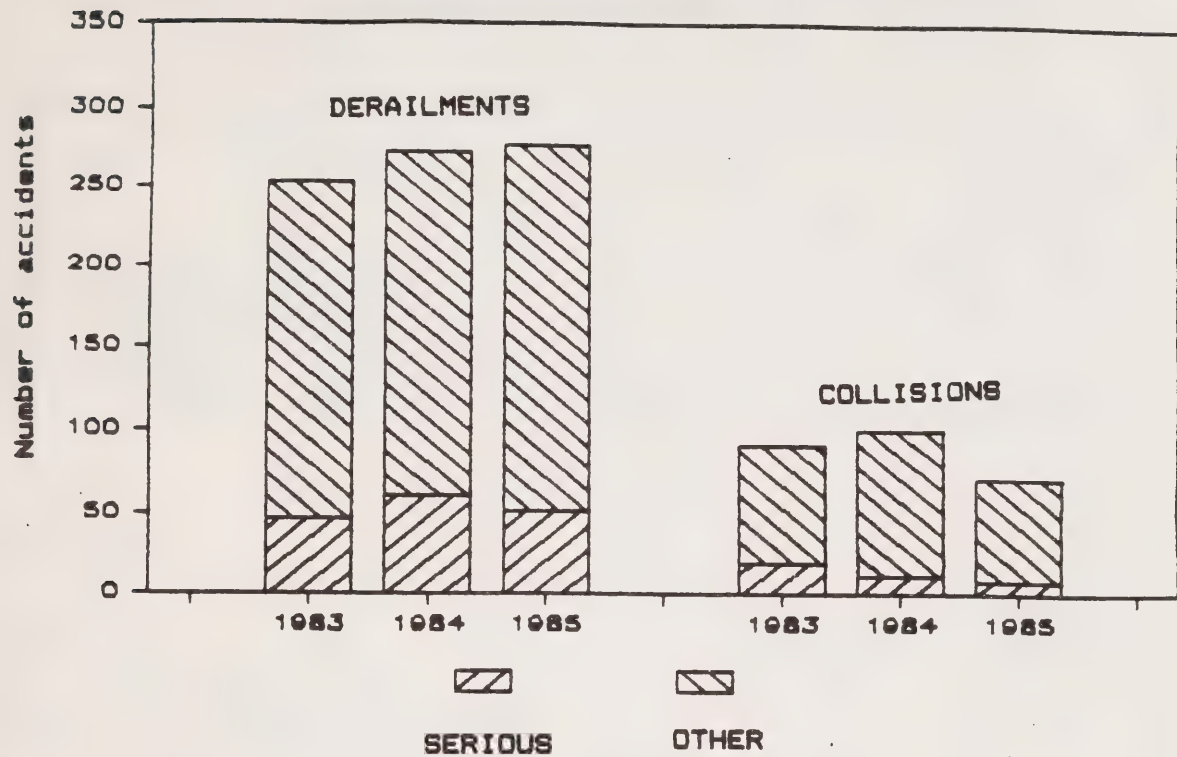
This section therefore attempts to place the above figures in perspective by establishing a set of criteria to indicate the seriousness of such accidents. Serious accidents are hereby defined as involving a fatality; or a major injury (e.g. loss of a limb or an eye, major fracture, etc.); or five or more minor injuries; or a major release of a dangerous good (e.g. resulting in or having high-potential for an explosion, fire or evacuation); or railway property damage in the three categories of more than \$500,000, \$250,000 to \$500,000 and \$100,000 to \$250,000. Some accidents qualify under more than one of these headings and, in such cases, the accident is classified in accordance with the order of criteria given in this list. A property damage threshold of \$100,000 is very modest given, as an example, that the current price of a grain hopper car is \$70,000. However, this property damage figure relates only to damage incurred by the railway itself and does not include third party claims on the railways; while this omission has obvious disadvantages, time delays in determining third party claims would prevent up-to-date reporting. Using the above criteria of severity, one finds that there were a total of 8 serious collisions and 51 serious derailments in 1985 as opposed to the 72 total collisions and 278 total derailments.

Table 8.1 presents the number of serious collisions and derailments along with total collisions and derailments for the years 1983-85. Over this period, only 15% of all collisions fell in the serious category while serious derailments accounted for one-fifth of all derailments (Figure 8.1). The table also shows that there has been an annual average of 66 serious accidents over the past three years. Three-fourths of the above serious accidents were those involving property damage in excess of \$100,000; but half of these property damage accidents were under \$250,000. The other 25% were those with serious casualty or D.C. involvement. Table 8.2 gives a more detailed breakdown of the serious cases by category.

The causes of serious collisions and derailments are presented in Table 8.3. As was the case in Section 2, the causes of serious collisions are almost entirely operations related. The breakdown of serious derailments by cause is different from Section 3 in that track conditions feature particularly high on serious cases.

Although this section has not examined crossing accidents, it was pointed out in Section 4 that 34% of the 605 crossing accidents in 1985 actually resulted in an injury of any kind and 8% resulted in a fatality. However, only 1% of all crossing accidents had any D.C. involvement, and as a rule, crossing accidents are not as serious as collisions and derailments in terms of financial damage to railway property and equipment. Usually, it is the motor vehicle that is heavily damaged or destroyed. Crossing accidents may result in substantial railway damage if an ensuing derailment occurs, but such cases amounted to less than 1.5% of the total crossing accidents in 1985.

Fig. 8.1
1983 - 85
COMPARISON OF SERIOUS COLLISIONS & DERAILMENTS
WITH TOTAL COLLISIONS & DERAILMENTS



8.1 SERIOUS AND TOTAL TRAIN COLLISIONS & DERAILMENTS (1983-85)

	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Collisions</u>			
Serious	20	11	8
All	92	102	72
 <u>Derailments</u>			
Serious	47	60	51
All	254	273	278
 <u>Collisions & Derailments</u>			
Serious	67	71	59
All	346	375	350

8.2 SERIOUS COLLISIONS & DERAILMENTS (1983-85)

	<u>1983</u>	<u>1984</u>	<u>1985</u>
<u>Collisions</u>			
Fatality	3	-	-
Major injury	4	5	7
Five or more minor injuries	4	1	-
Major dangerous goods release	3	2	-
Property damage exceeding \$500,000	-	-	-
Property damage in range of \$250,000 - \$500,000	2	1	-
Property damage in range of \$100,000 - \$250,000	4	2	1
TOTAL	<u>20</u>	<u>11</u>	<u>8</u>
<u>Derailments</u>			
Fatality	-	1	1
Major injury	3	-	2
Five or more minor injuries	2	-	-
Major dangerous goods release	-	3	5
Property damage exceeding \$500,000	11	13	6
Property damage in range of \$250,000 - \$500,000	10	19	12
Property damage in range of \$100,000 - \$250,000	21	24	25
TOTAL	<u>47</u>	<u>60</u>	<u>51</u>
<u>Collisions & Derailments</u>			
Fatality	3	1	1
Major injury	7	5	9
Five or more minor injuries	6	1	-
Major dangerous goods release	3	5	5
Property damage exceeding \$500,000	11	13	6
Property damage in range of \$250,000 - \$500,000	12	20	12
Property damage in range of \$100,000 - \$250,000	25	26	26
TOTAL	<u>67</u>	<u>71</u>	<u>59</u>

8.3 SERIOUS COLLISIONS & DERAILMENTS BY CAUSE (1984 and 1985)

	Year 1984		Year 1985	
	Number	%	Number	%
<u>Collisions</u>				
Track Related	-	-	-	-
Equipment Related	-	-	-	-
Operations Related	9	81.8	7	87.5
Other	2	18.2	1	12.5
	<u>11</u>	<u>100.0</u>	<u>8</u>	<u>100.0</u>
<u>Derailments</u>				
Track Related	35	58.3	35	68.6
Equipment Related	14	23.3	11	21.6
Operations Related	4	6.7	2	3.9
Other	7	11.7	3	5.9
	<u>60</u>	<u>100.0</u>	<u>51</u>	<u>100.0</u>

8.4 SERIOUS COLLISIONS BY CAUSE (1984 and 1985)

	<u>Main Track</u>		<u>Yard Movements</u>		<u>Total</u>	
<u>CN</u>	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
Operations Related	3	1	4	2	7	3
Equipment Related	-	-	-	-	-	-
Other	<u>2</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>2</u>	<u>1</u>
TOTAL	5	2	4	2	9	4
<u>CP</u>						
Operations Related	-	1	2	2	2	3
Equipment Related	-	-	-	-	-	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	-	1	2	2	2	3
<u>Other</u>						
Operations Related	-	1	-	-	-	1
Equipment Related	-	-	-	-	-	-
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	-	1	-	-	-	1
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8.5 SERIOUS DERAILMENTS BY CAUSE (1984 and 1985)

	<u>Main Track</u>		<u>Yard Movements</u>		<u>Total</u>	
	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>	<u>1984</u>	<u>1985</u>
<u>CN</u>						
Track Related	25	22	-	3	25	25
Equipment Related	9	8	-	-	9	8
Operations Related	3	-	-	-	3	-
Other	<u>6</u>	<u>2</u>	<u>-</u>	<u>-</u>	<u>6</u>	<u>2</u>
TOTAL	43	32	-	3	43	35

<u>CP</u>						
Track Related	10	10	-	-	10	10
Equipment Related	4	3	-	-	4	3
Operations Related	1	1	-	-	1	1
Other	<u>1</u>	<u>1</u>	<u>-</u>	<u>-</u>	<u>1</u>	<u>1</u>
TOTAL	16	15	-	-	16	15

<u>Other</u>						
Track Related	-	-	-	-	-	-
Equipment Related	1	-	-	-	1	-
Operations Related	-	-	-	1	-	1
Other	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL	1	-	-	1	1	1

<u>All Railways</u>			<u>%</u> <u>Change</u>			<u>%</u> <u>Change</u>	
Track Related	35	32	-8.6	-	3	35	35
Equipment Related	14	11	-21.4	-	-	14	11
Operations Related	4	1	-75.0	-	1	4	2
Other	<u>7</u>	<u>3</u>	<u>-57.1</u>	<u>-</u>	<u>-</u>	<u>7</u>	<u>3</u>
TOTAL	60	47	-21.7	-	4	60	51





Canadian Transport
Commission

Commission canadienne
des transports

Railway Transport
Committee

Comité des transports
par chemin de fer

Operations Branch

Direction de l'exploitation

**1986 SUMMARY
OF RAILWAY
ACCIDENTS / INCIDENTS
AS REPORTED TO THE
CANADIAN TRANSPORT COMMISSION**



Canada



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Railway Transport Committee
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INTRODUCTION

Railway accidents and incidents are unexpected occurrences involving trains, engines, cars or on-track equipment, that affect or could affect the safety of rail operations. Railroads under federal jurisdiction are required to notify the Canadian Transport Commission of railway occurrences if they result in property damage or casualty or involve the handling of dangerous goods. For the purposes of this report, railway occurrences have been classified into three broad categories: Train Accidents, Train Service Accidents and Incidents. Train Accidents include collisions, derailments and highway/railway crossing accidents; as a rule collisions and derailments are more costly in terms of physical damage while crossing accidents cause more casualties. Train Service Accidents include cases where employees or trespassers are struck by rolling stock or where personnel are injured in the process of entraining and detraining. Incidents include fires, dangerous commodity leakages, obstructions to main track and miscellaneous personal injuries sustained by railway passengers and employees.

Beginning with the 1982 version of the Accidents/Incidents Summary, the format of the publication changed in that an attempt was made to provide the reader with a fuller interpretation of the information being presented. The subsequent summaries have followed a similar format: the primary emphasis being on data for the current year and how it compares with comparable figures for the previous year. Each section examines a particular accident category, the associated accidents/incidents and related casualties.

With the increased attention being focussed on railway accidents, particularly train collisions and derailments, the 1985 Summary introduced a new section, in which an attempt was made to separate out serious train collisions and derailments from minor cases. A set of criteria for establishing the severity of an accident were defined and figures for serious accidents were presented for the three most recent years. The 1986 Summary presents similar data for 1984-86.

Railway occurrences are reportable only if they take place on track owned/serviced by railroads under federal jurisdiction, and responsibility for reporting lies with the railroad that owns/services the trackage. It is important to note that the Summary presents accidents/incidents (and their associated casualties) as they are reported to the Canadian Transport Commission and when statistics are presented by railway in this report (Sections 2, 3, 4, 5 and 8), the totals refer to the reporting railway. For accurate inter-railway comparisons therefore, accidents caused by external factors (vandalism, non-company error, etc.) should be excluded from the respective totals.

SECTION 1 Summary of Railway Occurrences

SECTION 1

SUMMARY OF RAILWAY OCCURRENCES

For purposes of this report, the following definitions have relevance:

Railway Occurrence

A generic expression that includes Train Accidents, Train Service Accidents and Incidents which were reported to the Commission pursuant to the requirements of S. 225 of the Railway Act, General Order 0-1 and related orders and regulations of the CTC.

Train Accident

An occurrence associated with the operation of a train, engine, car, track motor car (TMC) or other maintenance of way equipment (MWE) involving property damage in excess of \$750 for main line operations, and casualties or dangerous commodities in respect of both main line and yard operations, in which: -

- a) unit(s) of rolling stock derail (derailment)
- b) unit(s) of railway rolling stock collide with other unit(s) of railway rolling stock (collision) or with vehicular traffic at level crossings at grade (crossing accident).

(All public/highway crossings are reportable whereas accidents at farm and private crossings are reportable only if they involve a casualty/dangerous commodity/property damage in excess of \$750 for mainline operations.)

Train Service Accident

An occurrence associated with the operation of a train, engine, car, track motor car (TMC) or other maintenance of way equipment (MWE), in which:-

- a) an employee of the railway company is injured as a result of being struck by railway rolling stock or while in the process of entraining and detraining said rolling stock;
- b) a trespasser, passenger or any other person is injured as a result of being struck by railway rolling stock or while in the process of entraining or detraining said rolling stock.

Incident

An occurrence, other than an accident, associated with the operation of a train:-

- a) which affects or could affect the safety of operation
- b) whereby railway employees sustain personal injuries resulting from the performance of their duties (other than by a Train Accident or Train Service Accident)
- c) whereby railway passengers or other persons sustain personal injuries (other than by a Train Accident or Train Service Accident).

There is no minimum severity for reporting an injury - injuries can range from a loss of limb to a minor slip or fall.

Accidents

A total of 886 Train Accidents were reported to the Canadian Transport Commission in 1986, a considerable decline from the 1985 figure of 995. Rail traffic in 1986, as measured in carload tonnage handled was also down from 1985, but only by 0.4%. The ratio of accidents to work performed, which dropped sharply in 1983 and continued its downward trend over the next 2 years, recorded another sharp decline in 1986.

Some 59% of the above 886 Train Accidents occurred at railway grade crossings (Fig. 1.2), and this was much lower (13.4%) than the 1985 total. Train derailments which accounted for a further 29%, also showed a decline (6.8%). Crossing accidents and train derailments are the most serious in terms of loss of life and financial costs respectively. The accident rates (the ratio of accidents to miles of work performed) for these classes of accidents in recent years are well below the rates recorded during the 1979-82 period. Derailments and collisions that occur during yard operations are normally only reportable if they involve dangerous commodities (D.C.) or result in a casualty. It can be seen from Fig. 1.3 that although accidents on the main track account for the majority of train derailments, the reverse is the case for train collisions. Train collisions which accounted for just over 8% of all Train Accidents were up slightly (4.2%) over the 1985 total. Of the 75 train collisions in 1986, 14 were on the main track which is identical to the number in 1985. However, two of these accidents were the very serious high profile accidents at Hinton, Alberta and Trudel, Quebec which together resulted in 23 fatalities, 168 injuries and some \$45 million in damage costs. Without trying to negate the magnitude of the above occurrences, it should be pointed that most train collisions reported to the Commission occur in yards and are usually minor sideswipes during the course of switching/humping operations. The remaining accidents in the Train Accident Category are collisions/derailments involving on-track equipment such as track motor cars; these also declined considerably in 1986 (30.8%).

Train Accidents figures for 1986 also show that two-thirds of the total reportable train collisions involved D.C. cars; however, nearly all of these D.C. related collisions occurred in yards during switching operations. Approximately half of all train derailments were D.C. related and of these three-fourths occurred in yards or sidings. The risk of D.C. involvement in a crossing accident is considerably less; in 1986 a little over 1% of all crossing accidents were D.C. related. Train accidents are classified as D.C. related when they directly involve D.C. cars (loaded or empty). The vast majority of these cases do not result in any loss of product.

The absolute total of train collisions and derailments together has averaged 353 per annum over the past three years 1984-86. This may appear to be a large figure since it averages out to an accident a day. However, the minimum damage threshold for reporting a derailment or collision on the main track is rather low (\$750). Many of the derailments reported to the Canadian Transport Commission are of a minor nature involving the derailment of only one or two cars, and as has already been indicated above, the majority of the collisions

are minor sideswipes that occur in yards. Separating out the more serious cases from the above 353 total, there was an average of 64 serious accidents per year over the 1984-86 period. Nearly four-fifths of the above serious accidents were those involving property damage in excess of \$100,000; but half of these property damage accidents were under \$250,000. The other 21% were classified as serious due to the severity of D.C./casualty involvement.

Crossing accidents comprise the major portion of Train Accidents. In terms of severity, 7% of the 525 crossing accidents in 1986 resulted in at least one fatality and an additional 32% resulted in injury. It has already been pointed out that crossing accidents as a rule are not as serious as collisions and derailments in terms of D.C. involvement or financial damage to railway property/equipment.

There were 433 Train Service Accidents in 1986, which again was a large decline of 18% on 1985. Although these include employees/passengers /trespassers being struck by rolling stock, the majority of these accidents involved employees injured while getting off/on rolling stock.

There were 3,326 Incidents in 1986, which was an increase of 2.0% over the 1985 figure. These cover a wide variety of occurrences ranging from fires and D.C. leakages (not related to train accidents), to personal injuries incurred by railway employees and passengers. These personal injuries accounted for nearly four-fifths of all Incidents.

Casualties

Railway related fatalities decreased from 129 in 1985 to 116 in 1986, in spite of the Hinton train collision which accounted for 23 fatalities. This decline was brought about by the fall in crossing accident fatalities (20.7%) and trespasser deaths (36.2%). Crossing accidents accounted for 40% of total fatalities. Although crossing accidents have always accounted for a major portion of railway fatalities (Fig. 1.4), the persons killed are usually not railway employees or passengers. Almost all fatalities at railway crossings are motor vehicle occupants. Trespassers accounted for a further 32% of all railway fatalities and it can be argued that the railways cannot take meaningful preventative action in respect of many of these accidents.

The total number of injuries in 1986 declined slightly from the 1985 total. Incidents accounted for nearly three-fourths of the 3,542 injuries to passengers, employees and others during the year (Fig. 1.5). As mentioned in Section 7, there is no minimum severity for the reporting of these miscellaneous incident injuries: they range from a loss of a limb to a minor slip or fall. Train Service Accidents and accidents at railway crossings respectively accounted for a further 11% and 7% of total injuries. Train collisions accounted for an additional 6% due in large part to the accidents at Hinton and Trudel.

Three-fourths of all injuries in 1986 were to employees; passengers accounted for another 16%. Motor vehicle occupants accounted for most of the remaining injuries.

Figure 1.1
 TRAIN ACCIDENTS AND CARLOAD TONNAGE HANDLED
 1979-1986
 (1979 = 100)

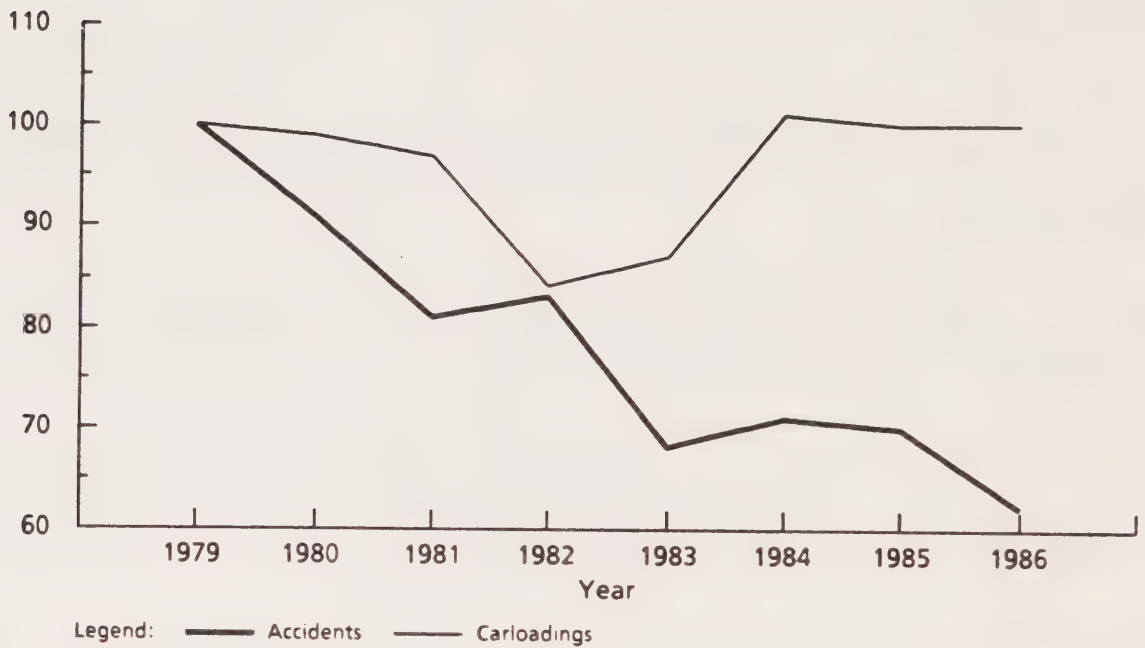
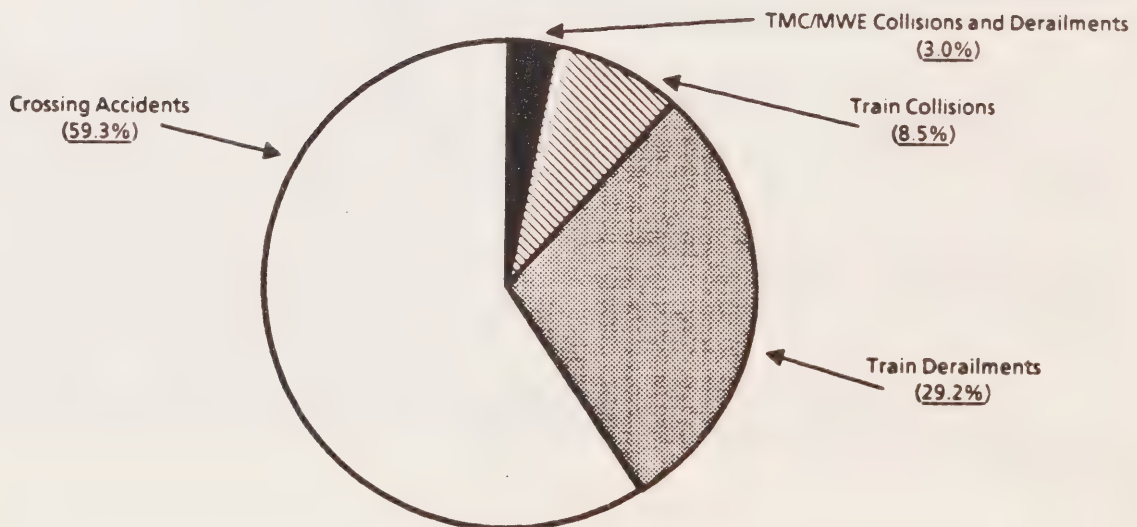


Figure 1.2
 TRAIN ACCIDENTS BY TYPE
 1986



Total Number of Accidents = 886

Figure 1.3

TRAIN DERAILMENTS AND COLLISIONS
1985 AND 1986

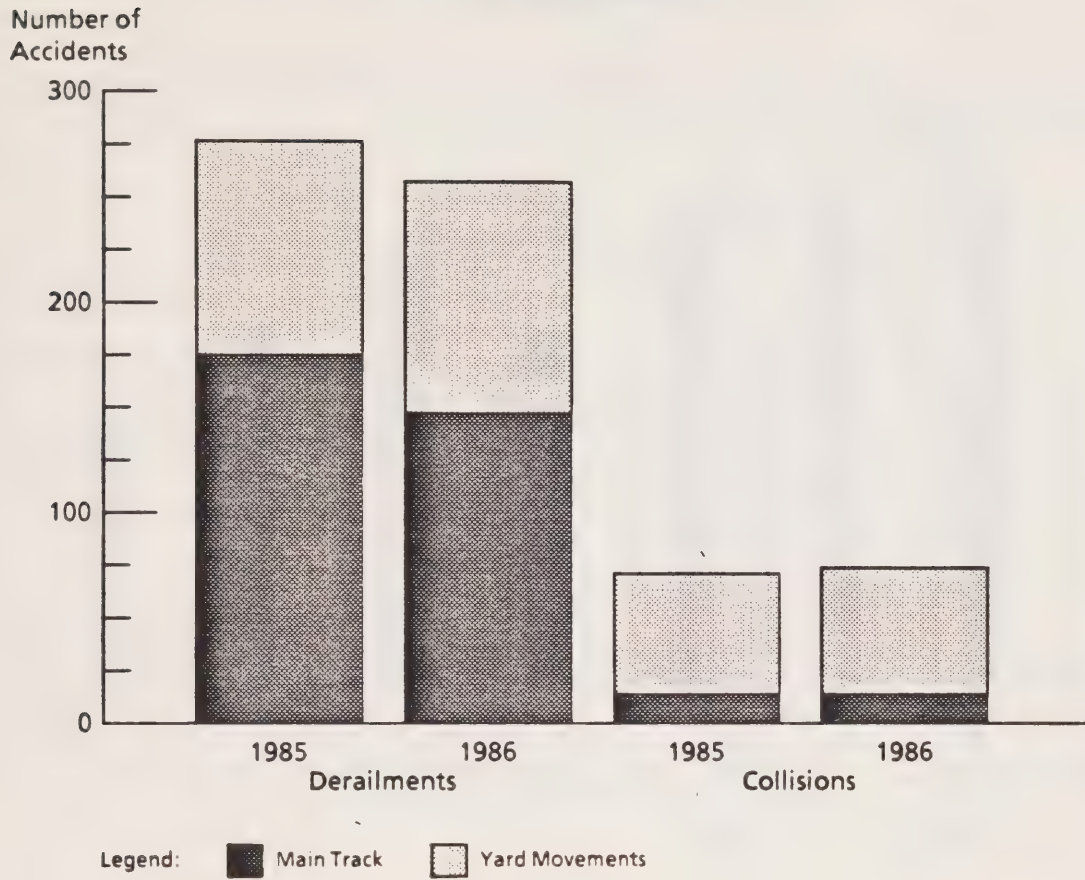


Figure 1.4

FATALITIES BY TYPE OF ACCIDENT 1979-1986

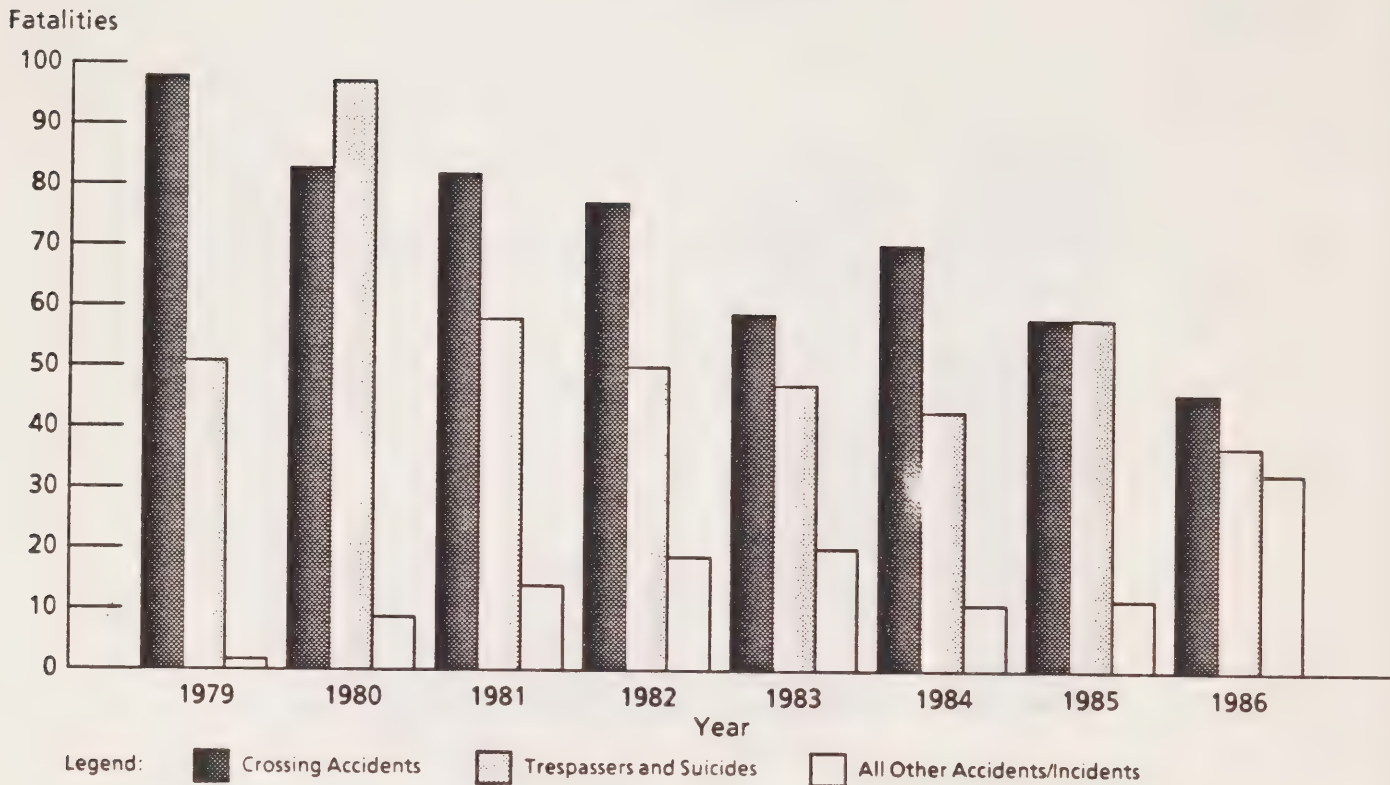


Figure 1.5

INJURIES BY TYPE OF ACCIDENT 1986

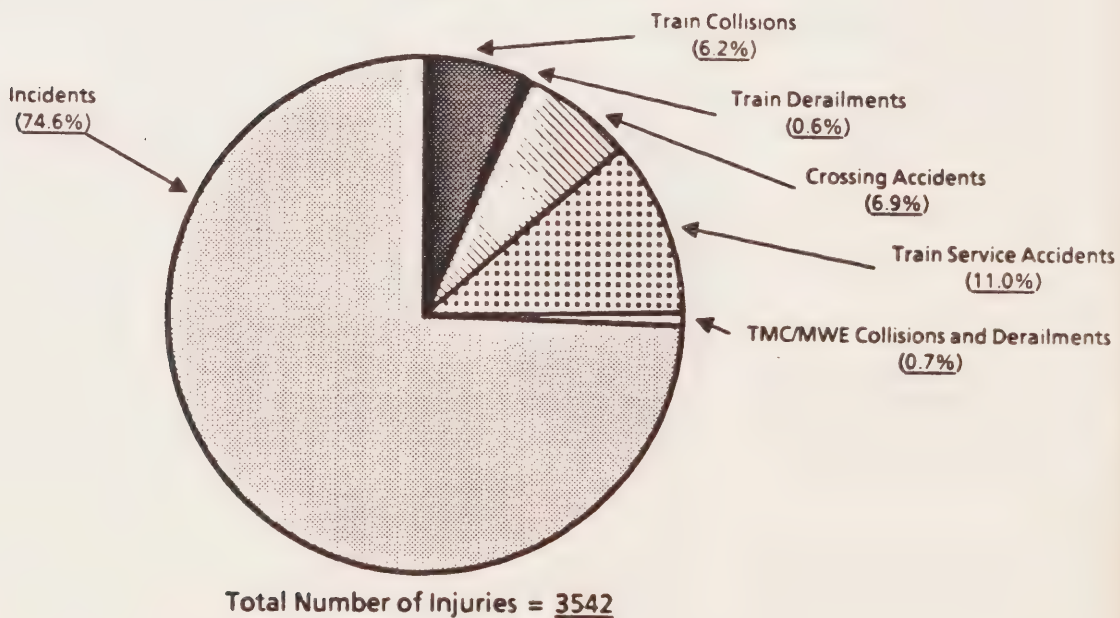


TABLE 1.1
NUMBER OF ACCIDENTS AND INCIDENTS
1985 and 1986

	Accidents/Incidents		
	1985	1986	% Change
<u>Train Accidents</u>			
Train Collisions	72	75	4.2
Train Derailments	278	259	-6.8
Crossing Accidents	606	525	-13.4
TMC/MWE Collisions/Derailments*	<u>39</u>	<u>27</u>	-30.8
Total Train Accidents	<u>995</u>	<u>886</u>	-11.0
<u>Train Service Accidents</u>			
Employees Struck by Rolling Stock	25	21	-16.0
Passengers Struck by Rolling Stock	2	0	-100.0
Trespassers Struck by Rolling Stock	104	86	-17.3
Employees Getting Off/On Rolling Stock	<u>397</u>	<u>326</u>	-17.9
Total Train Service Accidents	<u>528</u>	<u>433</u>	-18.0
<u>Incidents</u>			
Fires	226	231	2.2
Dangerous Commodities	336	398	18.5
All Other Incidents	<u>2,707</u>	<u>2,697</u>	-0.4
Total Incidents	<u>3,269</u>	<u>3,326</u>	1.7

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment

TABLE 1.2
NUMBER OF ACCIDENTS AND INCIDENTS
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Train Accidents</u>								
Train Collisions	80	97	108	101	92	102	72	75
Train Derailments	339	292	348	327	254	273	278	259
Crossing Accidents	937	826	763	691	567	596	606	525
TMC/MWE Collisions/ Derailments*	<u>68</u>	<u>81</u>	<u>69</u>	<u>61</u>	<u>53</u>	<u>45</u>	<u>39</u>	<u>27</u>
Total Train Accidents	<u>1,424</u>	<u>1,296</u>	<u>1,288</u>	<u>1,180</u>	<u>966</u>	<u>1,016</u>	<u>995</u>	<u>886</u>
Train Service Accidents**	N/A	N/A	<u>729</u>	<u>614</u>	<u>703</u>	<u>572</u>	<u>528</u>	<u>433</u>
<u>Incidents</u>								
Fires	246	229	221	273	254	202	226	231
Dangerous Commodities	51	107	157	105	288	418	336	398
All Other Incidents**	N/A	N/A	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,564</u>	<u>2,707</u>	<u>2,697</u>
Total Incidents			<u>3,264</u>	<u>3,189</u>	<u>2,925</u>	<u>3,184</u>	<u>3,269</u>	<u>3,326</u>
<u>D.C. Related Portion of Train Accidents</u>								
Train Collisions	17	44	65	67	56	66	43	50
Train Derailments	42	65	132	101	94	100	142	144
Crossing Accidents	2	11	4	8	9	10	8	6
<u>Carload Traffic Handled</u> (Thousands of Metric Tonnes)								
	237.4	235.6	229.7	199.4	206.7	239.9	237.9	237.0

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment

** Beginning with the 1982 Report, the statistical presentation of accident statistics changed. A complete time series is not possible because in earlier years a large portion of the injuries sustained in the Train Service Accidents were included under Miscellaneous Personal Injuries.

TABLE 1.3
CASUALTIES BY ACCIDENT/INCIDENT
1985 and 1986

	Employees		Passengers		Other		Total	
	1985	1986	1985	1986	1985	1986	1985	1986
<u>FATALITIES</u>								
<u>Train Accidents</u>								
Train Collisions	0	8	0	16	0	0	0	24
Train Derailments	1	0	0	0	0	0	1	0
Crossing Accidents	1	2	0	0	57	44	58	46
TMC/MWE Collisions/ Derailments*	2	0	0	0	0	0	2	0
<u>Train Service Accidents</u>	3	6	0	0	58	37	61	43
<u>Incidents</u>								
Fires	0	0	0	0	0	0	0	0
Dangerous Commodities	0	0	0	0	0	0	0	0
All Other Incidents	4	3	1	0	2	0	7	3
<u>Total Fatalities</u>	<u>11</u>	<u>19</u>	<u>1</u>	<u>16</u>	<u>117</u>	<u>81</u>	<u>129</u>	<u>116</u>
<u>INJURIES</u>								
<u>Train Accidents</u>								
Train Collisions	44	70	3	146	1	2	48	218
Train Derailments	22	20	0	1	0	0	22	21
Crossing Accidents	17	22	51	8	267	216	335	246
TMC/MWE Collisions/ Derailments*	53	26	0	0	0	0	53	26
<u>Train Service Accidents</u>	418	340	2	0	51	49	471	389
<u>Incidents</u>								
Fires	0	1	0	0	0	0	0	1
Dangerous Commodities	7	16	0	0	0	4	7	20
All Other Incidents	2,111	2,183	498	416	1	3	2,610	2,602
<u>Total Injuries</u>	<u>2,672</u>	<u>2,678</u>	<u>554</u>	<u>571</u>	<u>320</u>	<u>274</u>	<u>3,546</u>	<u>3,523</u>

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment

TABLE 1.4
CASUALTIES BY TYPE OF PERSON
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Fatalities</u>								
Passengers	0	0	1	1	4	0	1	16
Employees	10	10	13	17	16	11	11	19
Other	<u>141</u>	<u>179</u>	<u>140</u>	<u>128</u>	<u>106</u>	<u>113</u>	<u>117</u>	<u>81</u>
Total Fatalities	<u>151</u>	<u>189</u>	<u>154</u>	<u>146</u>	<u>126</u>	<u>124</u>	<u>129</u>	<u>116</u>
<u>Injuries</u>								
Passengers	400	334	636	667	534	429	554	571
Employees	3,358	3,137	3,189	2,962	2,658	2,720	2,672	2,678
Other	<u>453</u>	<u>428</u>	<u>412</u>	<u>337</u>	<u>319</u>	<u>324</u>	<u>320</u>	<u>274</u>
Total Injuries	<u>4,211</u>	<u>3,899</u>	<u>4,237</u>	<u>3,966</u>	<u>3,511</u>	<u>3,473</u>	<u>3,546</u>	<u>3,523</u>

SECTION 2 Collisions

SECTION 2

COLLISIONS

(Involving Train Movements Only)

Accidents

A train collision is an accident where a moving train, engine or car comes in contact with another train, engine or car. Collisions on main track with railway property damage above \$750 (or on any track if involving dangerous goods traffic or casualty) are reportable.

Two very serious high-profile train collisions occurred in 1986: the first on February 8 at Hinton, Alberta in which a freight train collided head-on with a passenger train and the second on February 15 at Trudel, Quebec in which a passenger train also collided head-on with a stationary freight train. Together these two accidents resulted in 23 fatalities and 168 injuries and over \$45 million in property damage. While in no way negating the magnitude of these accidents, total train collisions in 1986 were up only slightly over the figure in 1985. There were 75 collisions in 1986 compared to 72 in 1985 and these figures are considerably lower than the 1979-1984 annual average of 97. Four-fifths of the 1986 collisions occurred in yards (Figure 2.1). The vast majority of these yard collisions were minor sideswipes that occurred in the course of switching and humping operations. There were 14 collisions on the main track in 1986 which is identical to the 1985 figure. Of the 1986 cases, 6 were head-on collisions, 2 were side collisions, 1 was a tail-end collision, 1 was a broken-train collision and the remaining 4 were switching accidents. Passenger trains were involved in 4 of the main track collisions; in 1985 such collisions did not involve any passenger trains. Of the total 75 collisions in 1986, 33 resulted in a derailment. The corresponding figures for 1985 are 72 and 33 respectively.

Two-thirds of all train collisions in 1986 involved cars carrying dangerous commodities (D.C.), an increase of 16.3% over the previous year. This increase is due at least partly to greater reporting of accidents involving empty cars which last contained a D.C. Nearly all these D.C. related collisions occurred in yards during switching operations. D.C. cars involved in collisions may be loaded or empty, but the vast majority of these cases do not result in any loss of product.

The major causes of collisions are operations related. Employee failure - violation of operating rules and regulations - accounted for 85% of all collisions in 1986 (Figure 2.2). An additional 9% were equipment related while the remainder were due to vandalism or non-company error. An examination of rule violations (Table 2.4) indicates that the rules most often violated pertain to brake applications, cars being left foul of movements on adjacent tracks, and speed infractions.

The number of main track collisions per million train-miles was 0.18 in 1986, identical to the figure in 1985.

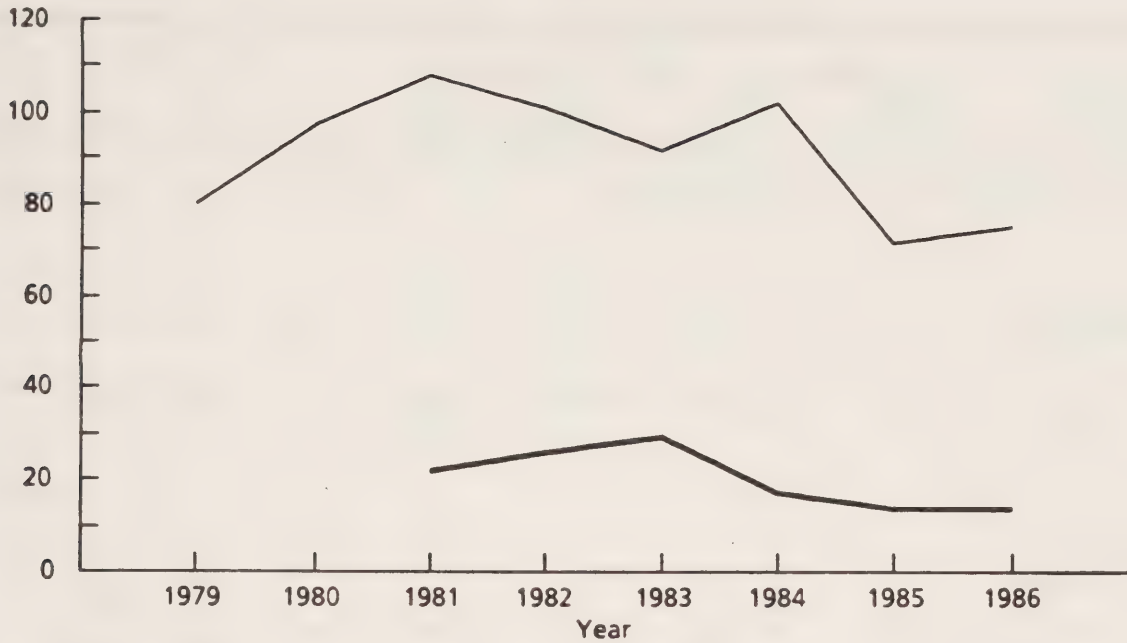
Casualties

Both injury and fatality totals increased dramatically due to the two collisions at Hinton (23 killed, 71 injured) and Trudel (97 injured). Total injuries due to train collisions numbered 218 in 1986 as compared to 48 in the previous year. In 1986, collisions accounted for a total of 24 fatalities. Between 1979-1985 there were only 14 fatalities as a result of train collisions, 7 of which were in 1983 and none in the years 1984-1985.

Figure 2.1

TRAIN COLLISIONS 1979-1986

Number of
Collisions

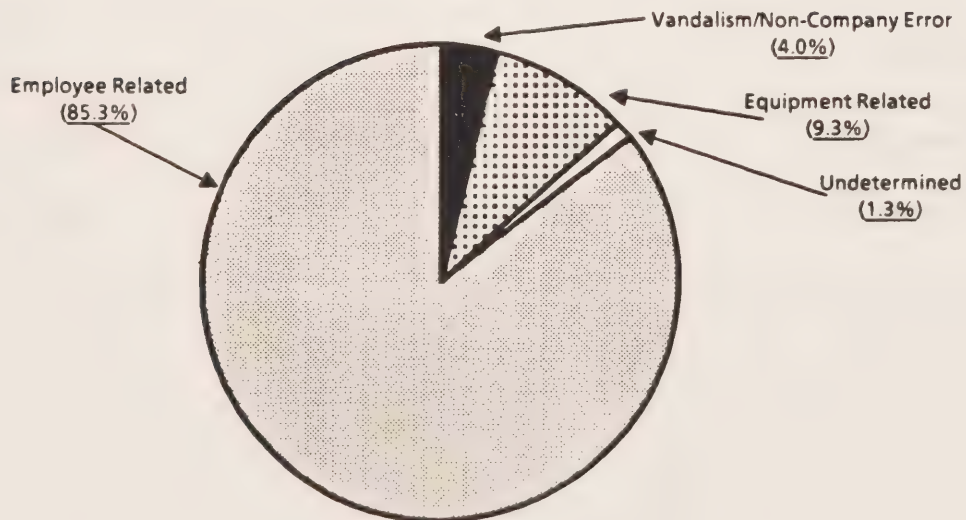


Legend: — Main Track Collisions* — Total Collisions

* Separate figures n/a for prior years.

Figure 2.2

COLLISIONS BY CAUSE 1986



Total Number of Collisions = 75

TABLE 2.1
NUMBER OF COLLISIONS BY REPORTING RAILWAY
1985 and 1986

	All Collisions			D.C. Related Collisions		
	1985	1986	% Change	1985	1986	%Change
<u>CN</u>						
Main Track	9	9		1	2	
Yard Movements	<u>35</u>	<u>44</u>		<u>26</u>	<u>33</u>	
Total CN	<u>44</u>	<u>53</u>		<u>27</u>	<u>35</u>	
<u>CP</u>						
Main Track	4	5		2	1	
Yard Movements	<u>23</u>	<u>16</u>		<u>14</u>	<u>13</u>	
Total CP	<u>27</u>	<u>21</u>		<u>16</u>	<u>14</u>	
<u>Other</u>						
Main Track	1	0		0	0	
Yard Movements	<u>0</u>	<u>1</u>		<u>0</u>	<u>1</u>	
Total Other	<u>1</u>	<u>1</u>		<u>0</u>	<u>1</u>	
<u>All Railways</u>						
Main Track	14	14	0.0	3	3	0.0
Yard Movements	<u>58</u>	<u>61</u>	5.2	<u>40</u>	<u>47</u>	17.5
Total Collisions	<u>72</u>	<u>75</u>	4.2	<u>43</u>	<u>50</u>	16.3

TABLE 2.2
COLLISION CASUALTIES BY REPORTING RAILWAY
1985 and 1986

	Employees*		Passengers		Total	
	1985	1986	1985	1986	1985	1986
<u>Fatalities</u>						
CN	0	7	0	16	0	23
CP	0	1	0	0	0	1
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>0</u>	<u>8</u>	<u>0</u>	<u>16</u>	<u>0</u>	<u>24</u>
<u>Injuries</u>						
CN	29	58	0	146	29	204
CP	14	14	3	0	17	14
Other	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>
Total Injuries	<u>45</u>	<u>72</u>	<u>3</u>	<u>146</u>	<u>48</u>	<u>218</u>

* 1985 CN injuries include 1 industrial employee

** 1986 CN injuries include 2 industrial employees

TABLE 2.3
COLLISIONS BY CAUSE BY REPORTING RAILWAY
1985 and 1986

	Main Track			Yard Movements			Total		
	1985	1986	% Change	1985	1986	% Change	1985	1986	% Change
<u>CN</u>									
Operations Related	8	8		33	38		41	46	
Equipment Related	0	0		1	4		1	4	
Vandalism/Non-									
Company Error	1	1		0	2		1	3	
Undetermined	<u>0</u>	<u>0</u>		<u>1</u>	<u>0</u>		<u>1</u>	<u>0</u>	
Total CN	<u>9</u>	<u>9</u>		<u>35</u>	<u>44</u>		<u>44</u>	<u>53</u>	
<u>CP</u>									
Operations Related	3	4		21	13		24	17	
Equipment Related	0	1		2	2		2	3	
Vandalism/Non-									
Company Error	1	0		0	0		1	0	
Undetermined	<u>0</u>	<u>0</u>		<u>0</u>	<u>1</u>		<u>0</u>	<u>1</u>	
Total CP	<u>4</u>	<u>5</u>		<u>23</u>	<u>16</u>		<u>27</u>	<u>21</u>	
<u>Other</u>									
Operations Related	1	0		0	1		1	1	
Equipment Related	0	0		0	0		0	0	
Vandalism/Non-									
Company Error	0	0		0	0		0	0	
Undetermined	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	
Total Other	<u>1</u>	<u>0</u>		<u>0</u>	<u>1</u>		<u>1</u>	<u>1</u>	
<u>All Railways</u>									
Operations Related	12	12	0.0	54	52	-3.7	66	64	-3.0
Equipment Related	0	1	-	3	6	100.0	3	7	133.3
Vandalism/Non-									
Company Error	2	1	-50.0	0	2	-	2	3	50.0
Undetermined	<u>0</u>	<u>0</u>	-	<u>1</u>	<u>1</u>	0.0	<u>1</u>	<u>1</u>	0.0
Total Collisions	<u>14</u>	<u>14</u>	0.0	<u>58</u>	<u>61</u>	5.2	<u>72</u>	<u>75</u>	4.2

TABLE 2.4
COLLISIONS BY DETAILED CAUSE
1984 - 1986

Assessed Cause	1984	1985	1986
1. Crew communication deficiency	9	9	6
2. Improper handling of switches or derails	9	6	8
3. Insufficient or improper brake applications	26	18	16
4. Improper positioning of car or movement	19	13	16
5. Excess speed	21	19	15
6. Other employee failure	<u>10</u>	<u>1</u>	<u>3</u>
Total operations related causes (1-6)	94	66	64
7. Equipment related causes	4	3	7
8. Vandalism/Non-Company Error	4	2	3
9. Undetermined	<u>0</u>	<u>1</u>	<u>1</u>
Total Collisions	<u>102</u>	<u>72</u>	<u>75</u>

TABLE 2.5
NUMBER OF COLLISIONS AND CASUALTIES BY REPORTING RAILWAY
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Number of Collisions</u>								
CN	46	47	69	59	61	79	44	53
CP	29	44	36	38	27	23	27	21
Other	<u>5</u>	<u>6</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>0</u>	<u>1</u>	<u>1</u>
Total Collisions	<u>80</u>	<u>97</u>	<u>108</u>	<u>101</u>	<u>92</u>	<u>102</u>	<u>72</u>	<u>75</u>
<u>Number of Casualties</u>								
<u>Fatalities</u>								
CN	1	0	3	0	2	0	0	23
CP	2	1	0	0	5	0	0	1
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>3</u>	<u>1</u>	<u>3</u>	<u>0</u>	<u>7</u>	<u>0</u>	<u>0</u>	<u>24</u>
<u>Injuries</u>								
CN	48	31	47	127	95	60	29	204
CP	15	21	19	16	34	13	17	14
Other	<u>9</u>	<u>9</u>	<u>1</u>	<u>4</u>	<u>34</u>	<u>0</u>	<u>2</u>	<u>0</u>
Total Injuries	<u>72</u>	<u>61</u>	<u>67</u>	<u>147</u>	<u>163</u>	<u>73</u>	<u>48</u>	<u>218</u>

TABLE 2.6
MAIN TRACK TRAIN COLLISIONS PER MILLION TRAIN-MILES (MTM) BY REPORTING RAILWAY
1979 - 1986**

	1979	1980	1981	1982	1983	1984	1985	1986
<u>CN</u>								
Total Collisions	46	47	69	59	61	79	44	53
Main Track Collisions*			13	15	18	14	9	9
MTM	52.2	50.5	48.6	41.0	42.9	46.3	45.0	44.8
Main Track Collisions Per MTM			0.27	0.37	0.42	0.30	0.20	0.20
<u>CP</u>								
Total Collisions	29	44	36	38	27	23	27	21
Main Track Collisions*			8	9	9	3	4	5
MTM	29.6	29.6	29.7	26.4	26.8	28.2	27.5	27.4
Main Track Collisions Per MTM			0.27	0.34	0.34	0.11	0.15	0.18
<u>Other</u>								
Total Collisions	5	6	3	4	4	0	1	1
Main Track Collisions*			2	2	2	0	1	0
MTM	9.8	9.2	7.6	6.5	6.3	6.8	6.7	6.6***
Main Track Collisions Per MTM			0.26	0.31	0.32	0.00	0.15	0.00***
<u>All Railways</u>								
Total Collisions	80	97	108	101	92	102	72	75
Main Track Collisions*			22	26	29	17	14	14
MTM	91.6	89.2	85.8	73.9	76.0	81.3	79.1	78.8***
Main Track Collisions Per MTM			0.26	0.35	0.38	0.21	0.18	0.18***

- * Separate figures are not available for main track collisions for years prior to 1981
- ** VIA train-miles are included in CN and CP
- *** Estimated

TABLE 2.7
COLLISIONS AND CASUALTIES BY PROVINCE
1985 and 1986

	1985			1986		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	0	0	0	0	0	0
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	0	0	0	1	0	1
New Brunswick	3	0	3	2	0	4
Quebec	11	0	14	15	0	108
Ontario	13	0	10	26	1	17
Manitoba	7	0	5	6	0	4
Saskatchewan	6	0	3	3	0	1
Alberta	15	0	3	15	23	82
British Columbia	17	0	10	7	0	1
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u><u>72</u></u>	<u><u>0</u></u>	<u><u>48</u></u>	<u><u>75</u></u>	<u><u>24</u></u>	<u><u>218</u></u>

SECTION 3 Derailments

SECTION 3

DERAILMENTS

(Involving Train Movements Only)

Accidents

A train derailment is an accident where any moving train, engine or car is derailed. Reporting criteria are the same as for collisions: derailments are reportable if they occur on main track with railway property damage above \$750 (or any track if involving dangerous goods traffic or casualty). However, unlike collisions, most reportable derailments involve trains operating over main track as opposed to yard movements (Fig. 3.1).

There were 259 train derailments reported in 1986, a drop of 6.8% from 1985. Nearly six-tenths of the derailments in 1986 occurred on the main track and this was a substantial decline of 15.9% over the 1985 figure. Yard derailments increased from 102 to 111. As explained in Section 2, the rise can be explained at least partly by the increased reporting of derailments involving empty cars which last contained a dangerous commodity (D.C.). Of the 148 main track derailments in 1986, 3 involved passenger trains; in 1985 the corresponding numbers were 176 and 4 respectively.

Just over half of all derailments in 1986 involved D.C. cars, the total being almost the same as in 1985. Three fourths of D.C. related derailments occurred in yards or sidings. D.C. related derailments on the main track actually declined by 20.0% while yard accidents increased by 11.3%. As mentioned above, the number of train accidents involving empty cars which last contained dangerous goods are now being reported more comprehensively. This more complete reporting has been brought about not only by the increased public concern over D.C. traffic, but also due to the Railway Transport Committee's extensive discussion on accidents involving empty D.C. cars in a Decision issued in early 1985. As in the case of train collisions (Section 2), most D.C. cars (loaded or empty) involved in a derailment do not result in any loss of product.

The breakdown of main track derailments by number of cars and/or engines derailed is illustrated in Fig. 3.2. Half of all derailments on the main track resulted in the derailment of only one or two cars/engines. Single and two car/engine derailments also accounted for three-fourths of all yard cases (Table 3.8). Both in 1985 and 1986, those accidents that resulted in the derailment of over 10 cars accounted for 12% of all train derailments.

In 1986, one-third of all derailments were track related, 22% equipment related, 27% operations related and the balance attributable to miscellaneous causes (Fig. 3.3). Of the track related derailments, 87% were due to component failures in the track itself with broken rails and joints, gauge restraint, inadequate track geometry and turnout component defects being the major causes. The rest were the result of climatological related factors such as snow/ice on the track, slides and washouts. One-third of the equipment related derailments were caused by journal failures with broken wheels, being the next most prominent cause. Rule violations and other employee failure accounted for nearly four-fifths of the operations related derailments. The miscellaneous category includes loading

defects, vandalism or non-company error, and cases of wheel lift or mounting of the rail with no significant track, equipment or operations defect identifiable. The causes of derailments are considerably different between main track and yard cases. Equipment failures almost all occurred on the main track in 1986. On the other hand, operational causes were more prevalent in respect of yard derailments. Track related causes accounted for a third of the cases -for both main track and yard accidents (Table 3.3). The pattern of derailments by cause is illustrated in Figure 3.4. The miscellaneous category has fluctuated due to the variability in vandalism and combination (track/equipment /operational) cases. The lower number of track and equipment related derailments in recent years as compared to the totals in the early eighties is the result of improvements in maintenance and equipment (Table 3.4).

The number of main track derailments per billions of Freight Gross Ton-miles was 0.46 in 1986 down from 0.56 in 1985.

Casualties

Deraillments as a rule are not serious in terms of casualties. Since 1979, train derailments have accounted for a total of 3 fatalities. There were none in 1986, as compared to 1 in 1985. Derailments in 1986 did, however, result in 21 injuries which is nearly identical to the figure of 22 in 1985.

Figure 3.1

TRAIN DERAILMENTS 1979-1986

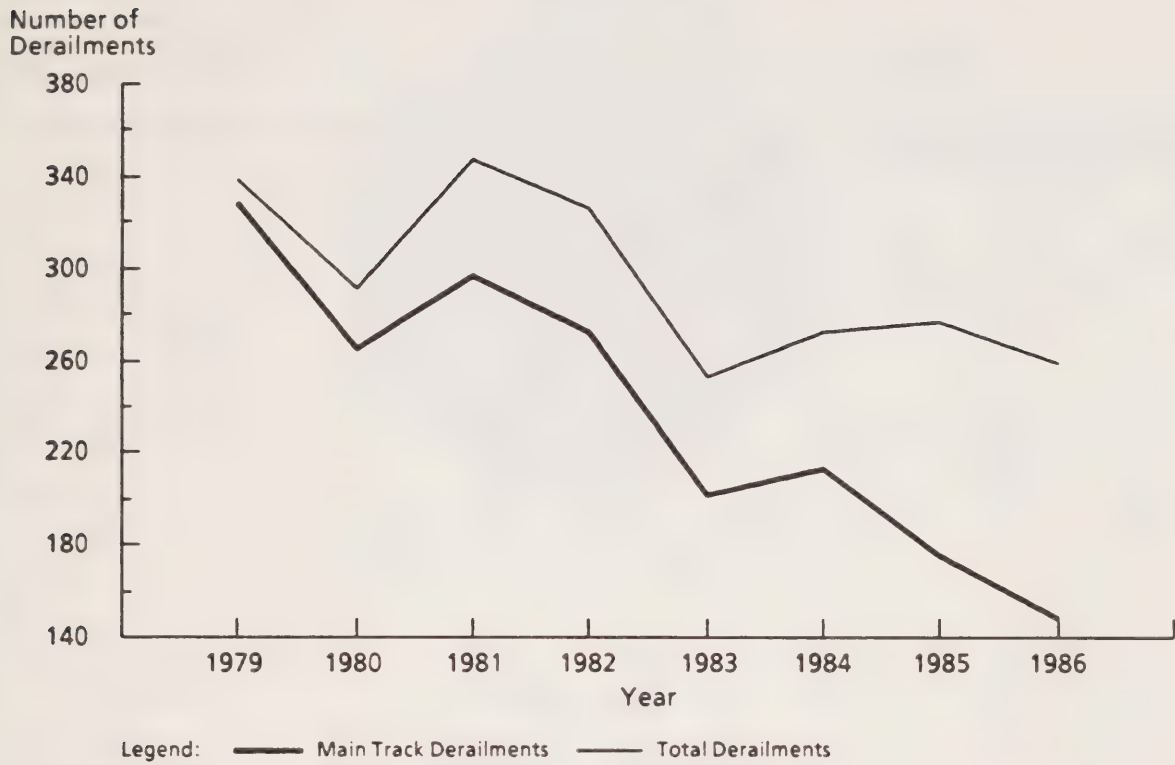


Figure 3.2

MAIN TRACK TRAIN DERAILMENTS BY NUMBER OF CARS/ENGINES DERAILED 1985 AND 1986

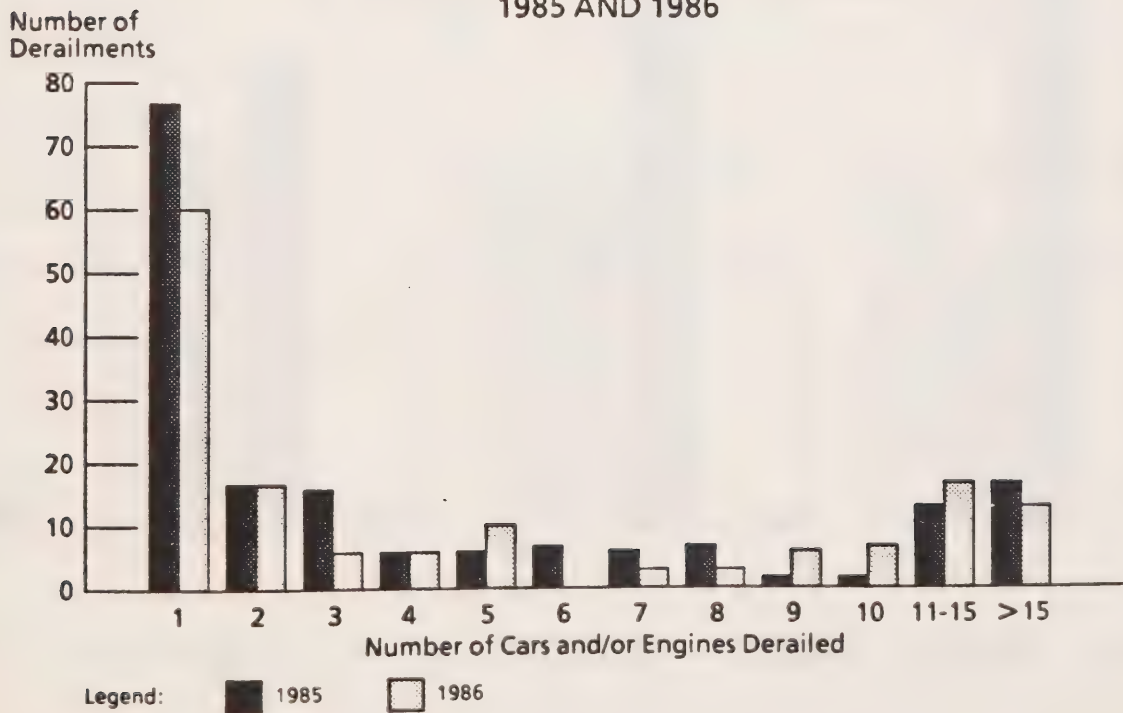
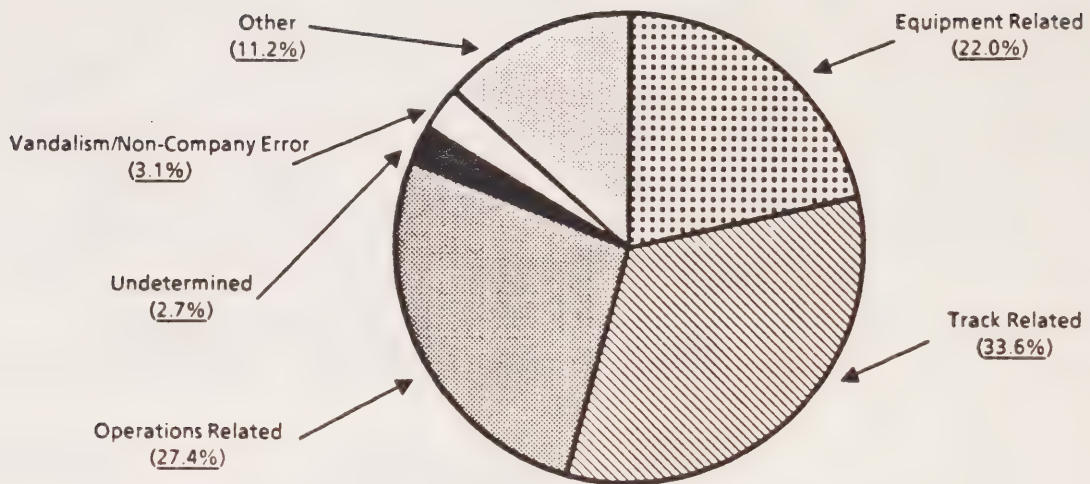


Figure 3.3

DERAILMENTS BY CAUSE 1986

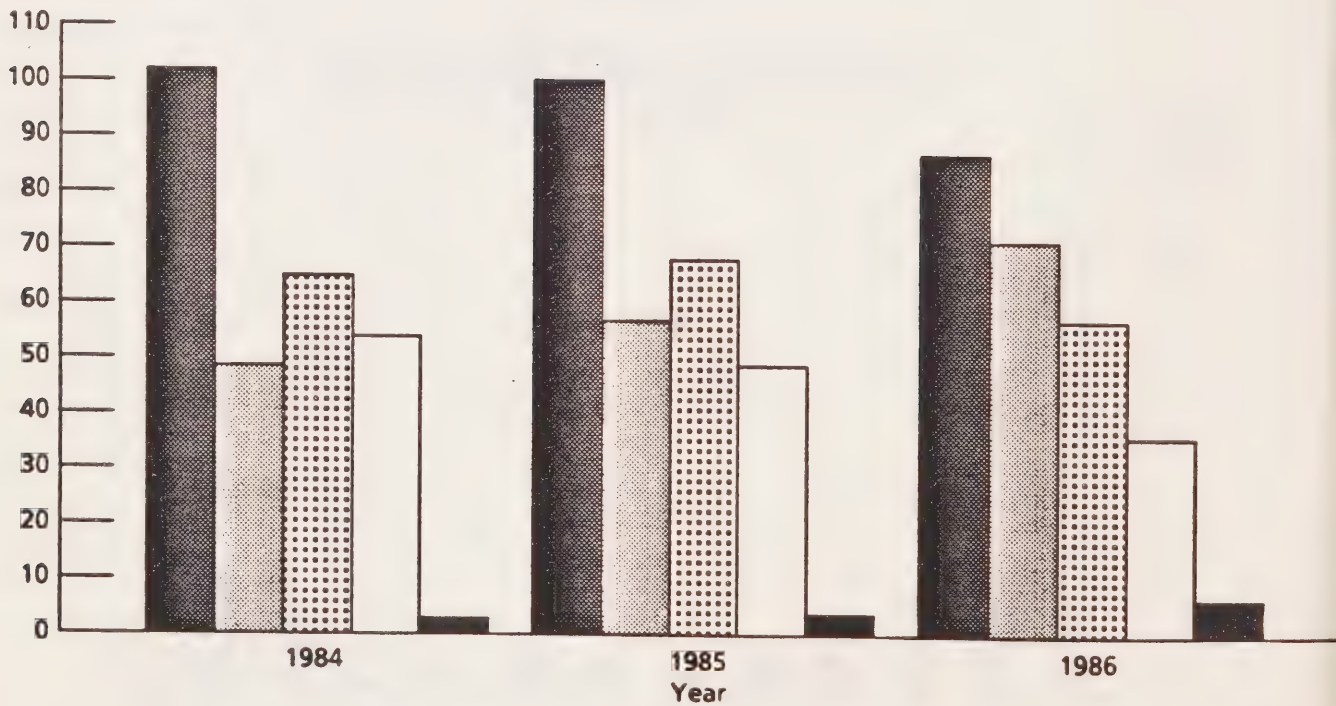


Total Number of Derailments = 259

Figure 3.4

DERAILMENTS BY CAUSE 1984-1986

Number of
Derailments



Legend: Track Related Operations Related Equipment Related Other Undetermined

TABLE 3.1
NUMBER OF DERAILMENTS BY REPORTING RAILWAY
1985 and 1986

	All Derailments			D.C. Related Derailments		
	<u>1985</u>	<u>1986</u>	<u>% Change</u>	<u>1985</u>	<u>1986</u>	<u>% Change</u>
<u>CN</u>						
Main Track	108	90		26	22	
Yard Movements	<u>51</u>	<u>55</u>		<u>47</u>	<u>53</u>	
Total CN	<u>159</u>	<u>145</u>		<u>73</u>	<u>75</u>	
<u>CP</u>						
Main Track	59	48		19	12	
Yard Movements	<u>35</u>	<u>41</u>		<u>35</u>	<u>41</u>	
Total CP	<u>94</u>	<u>89</u>		<u>54</u>	<u>53</u>	
<u>Other</u>						
Main Track	9	10		0	2	
Yard Movements	<u>16</u>	<u>15</u>		<u>15</u>	<u>14</u>	
Total Other	<u>25</u>	<u>25</u>		<u>15</u>	<u>16</u>	
<u>All Railways</u>						
Main Track	176	148	-15.9	45	36	-20.0
Yard Movements	<u>102</u>	<u>111</u>	8.8	<u>97</u>	<u>108</u>	11.3
Total Derailments	<u>278</u>	<u>259</u>	-6.8	<u>142</u>	<u>144</u>	1.4

TABLE 3.2
DERAILMENT CASUALTIES BY REPORTING RAILWAY
1985 and 1986

	Employees		Passengers		Total	
	1985	1986	1985	1986	1985	1986
<u>Fatalities</u>						
CN	1	0	0	0	1	0
CP	0	0	0	0	0	0
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>
<u>Injuries</u>						
CN	12	11	0	1	12	12
CP	7	7	0	0	7	7
Other	<u>3</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>2</u>
Total Injuries	<u>22</u>	<u>20</u>	<u>0</u>	<u>1</u>	<u>22</u>	<u>21</u>

TABLE 3.3
DERAILMENTS BY CAUSE BY REPORTING RAILWAY
1985 and 1986

	Main Track			Yard Movements			Total		
	1985	1986	% Change	1985	1986	% Change	1985	1986	% Change
<u>CN</u>									
Track Related	45	31		17	16		62	47	
Equipment Related	41	32		2	5		43	37	
Operations Related	11	12		22	23		33	35	
Other	11	11		8	5		19	16	
Vandalism/Non- Company Error	0	3		2	4		2	7	
Undetermined	<u>0</u>	<u>1</u>		<u>0</u>	<u>2</u>		<u>0</u>	<u>3</u>	
Total CN	<u>108</u>	<u>90</u>		<u>51</u>	<u>55</u>		<u>159</u>	<u>145</u>	
<u>CP</u>									
Track Related	21	15		9	11		30	26	
Equipment Related	21	17		1	1		22	18	
Operations Related	6	6		14	26		20	32	
Other	8	10		8	1		16	11	
Vandalism/Non- Company Error	1	0		2	0		3	0	
Undetermined	<u>2</u>	<u>0</u>		<u>1</u>	<u>2</u>		<u>3</u>	<u>2</u>	
Total CP	<u>59</u>	<u>48</u>		<u>35</u>	<u>41</u>		<u>94</u>	<u>89</u>	
<u>Other</u>									
Track Related	4	4		5	10		9	14	
Equipment Related	2	2		1	0		3	2	
Operations Related	0	1		4	3		4	4	
Other	1	2		4	0		5	2	
Vandalism/Non- Company Error	2	0		2	1		4	1	
Undetermined	<u>0</u>	<u>1</u>		<u>0</u>	<u>1</u>		<u>0</u>	<u>2</u>	
Total Other	<u>9</u>	<u>10</u>		<u>16</u>	<u>15</u>		<u>25</u>	<u>25</u>	
<u>All Railways</u>									
Track Related	70	50	-28.6	31	37	19.4	101	87	-13.9
Equipment Related	64	51	-20.3	4	6	50.0	68	57	-16.2
Operations Related	17	19	11.8	40	52	30.0	57	71	24.6
Other	20	23	15.0	20	6	-70.0	40	29	-27.5
Vandalism/Non- Company Error	3	3	0.0	6	5	-16.7	9	8	-11.1
Undetermined	<u>2</u>	<u>2</u>	0.0	<u>1</u>	<u>5</u>	400.0	<u>3</u>	<u>7</u>	133.3
Total Derailments	<u>176</u>	<u>148</u>	-15.9	<u>102</u>	<u>111</u>	8.8	<u>278</u>	<u>259</u>	6.8

TABLE 3.4
DERAILMENTS BY DETAILED CAUSE
1982 - 1986

Assessed Cause	1982	1983	1984	1985	1986
Snow, ice, mud	10	8	6	18	8
Slides, unstable slopes, subsidence	14	5	6	6	2
Washouts, floods	4	2	3	3	1
Track failure - rail buckle	9	14	11	6	7
Track failure - rail rollover	17	8	5	3	2
Track failure - gage restraint	9	13	16	4	16
Track failure - rail or joint broken	26	21	22	26	15
Track failure - type unidentified	0	1	1	3	1
Track geometry	23	19	22	20	20
Turnout component defect	<u>10</u>	<u>9</u>	<u>10</u>	<u>12</u>	<u>15</u>
Total Track Related	<u>122</u>	<u>100</u>	<u>102</u>	<u>101</u>	<u>87</u>
Loose wheels	2	1	1	2	1
Broken wheels	10	10	9	11	12
Broken axles	4	10	7	3	5
Journal failures - roller bearings	15	17	22	19	17
Journal failures - friction bearings	14	9	8	7	2
Truck component defect	9	5	4	9	5
Brake gear defective or dragging	6	4	5	10	3
Draft gear failure	9	8	5	3	6
Other rolling stock defects	<u>10</u>	<u>7</u>	<u>4</u>	<u>4</u>	<u>6</u>
Total Equipment Related	<u>79</u>	<u>71</u>	<u>65</u>	<u>68</u>	<u>57</u>
Rule violations	37	25	31	33	42
Other employee failure	18	12	10	15	14
Traincontrol or marshalling	<u>10</u>	<u>10</u>	<u>8</u>	<u>9</u>	<u>15</u>
Total Operations Related	<u>65</u>	<u>47</u>	<u>49</u>	<u>57</u>	<u>71</u>
Loading defects	8	13	12	16	3
Vandalism and non-company error	27	5	18	9	8
Combination - track, equip., operational	17	17	24	24	26
Undetermined	<u>9</u>	<u>1</u>	<u>3</u>	<u>3</u>	<u>7</u>
Total Miscellaneous Cases	<u>61</u>	<u>36</u>	<u>57</u>	<u>52</u>	<u>44</u>
Total Derailments	<u>327</u>	<u>254</u>	<u>273</u>	<u>278</u>	<u>259</u>

TABLE 3.5
NUMBER OF DERAILMENTS BY REPORTING RAILWAY
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>CN</u>								
Main Track Trains	232	186	204	176	139	128	108	90
Yard Movements	<u>7</u>	<u>23</u>	<u>32</u>	<u>20</u>	<u>30</u>	<u>38</u>	<u>51</u>	<u>55</u>
Total CN	<u>239</u>	<u>209</u>	<u>236</u>	<u>196</u>	<u>169</u>	<u>166</u>	<u>159</u>	<u>145</u>
<u>CP</u>								
Main Track Trains	90	70	82	89	55	73	59	48
Yard Movements	<u>2</u>	<u>2</u>	<u>13</u>	<u>22</u>	<u>9</u>	<u>13</u>	<u>35</u>	<u>41</u>
Total CP	<u>92</u>	<u>72</u>	<u>95</u>	<u>111</u>	<u>64</u>	<u>86</u>	<u>94</u>	<u>89</u>
<u>Other</u>								
Main Track Trains	6	9	11	8	8	12	9	10
Yard Movements	<u>2</u>	<u>2</u>	<u>6</u>	<u>12</u>	<u>13</u>	<u>9</u>	<u>16</u>	<u>15</u>
Total Other	<u>8</u>	<u>11</u>	<u>17</u>	<u>20</u>	<u>21</u>	<u>21</u>	<u>25</u>	<u>25</u>
<u>All Railways</u>								
Main Track Trains	328	265	297	273	202	213	176	148
Yard Movements	<u>11</u>	<u>27</u>	<u>51</u>	<u>54</u>	<u>52</u>	<u>60</u>	<u>102</u>	<u>111</u>
Total Derailments	<u>339</u>	<u>292</u>	<u>348</u>	<u>327</u>	<u>254</u>	<u>273</u>	<u>278</u>	<u>259</u>

TABLE 3.6
DERAILMENT CASUALTIES BY REPORTING RAILWAY
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Fatalities</u>								
CN	0	0	0	0	0	0	1	0
CP	1	0	0	0	0	1	0	0
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u><u>1</u></u>	<u><u>0</u></u>	<u><u>0</u></u>	<u><u>0</u></u>	<u><u>0</u></u>	<u><u>1</u></u>	<u><u>1</u></u>	<u><u>0</u></u>
<u>Injuries</u>								
CN	40	77	83	46	31	14	12	12
CP	33	25	8	49	4	13	7	7
Other	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>7</u>	<u>0</u>	<u>3</u>	<u>2</u>
Total Injuries	<u><u>73</u></u>	<u><u>103</u></u>	<u><u>92</u></u>	<u><u>95</u></u>	<u><u>42</u></u>	<u><u>27</u></u>	<u><u>22</u></u>	<u><u>21</u></u>

TABLE 3.7
MAIN TRACK TRAIN DERAILMENTS PER BILLIONS OF FREIGHT GROSS TON-MILES
BY REPORTING RAILWAY
(FREIGHT BGTM)
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>CN</u>								
Total Derailments	239	209	236	196	169	166	159	145
Main Track Derailments	232	186	204	176	139	128	108	90
Freight BGTM	155.4	161.0	159.3	139.6	157.7	174.7	166.4	170.9
Main Track Derailments Per Freight BGTM	1.49	1.16	1.28	1.26	0.88	0.73	0.65	0.53
<u>CP</u>								
Total Derailments	92	72	95	111	64	86	94	89
Main Track Derailments	90	70	82	89	55	73	59	48
Freight BGTM	114.7	114.0	119.3	112.8	119.6	127.9	120.9	121.3
Main Track Derailments Per Freight BGTM	0.78	0.61	0.69	0.79	0.46	0.57	0.49	0.40
<u>Other</u>								
Total Derailments	8	11	17	20	21	21	25	25
Main Track Derailments	6	9	11	8	8	12	9	10
Freight BGTM	37.8	33.5	30.6	23.1	21.3	18.4	27.4	28.0*
Main Track Derailments Per Freight BGTM	0.16	0.27	0.36	0.35	0.38	0.65	0.33	0.36*
<u>All Railways</u>								
Total Derailments	339	292	348	327	254	273	278	259
Main Track Derailments	328	265	297	273	202	213	176	148
Freight BGTM	307.9	308.5	309.2	275.6	298.5	321.0	314.7	320.2*
Main Track Derailments Per Freight BGTM	1.07	0.86	0.96	0.99	0.68	0.66	0.56	0.46*

* Estimated

TABLE 3.8
DERAILMENTS BY NUMBER OF CARS AND/OR ENGINES DERAILED
1985 and 1986

No. of Cars and/or Engines Derailed	1985 Derailments		1986 Derailments	
	Main Track	Yard	Main Track	Yard
1	77	45	60	57
2	17	23	17	27
3	16	17	6	10
4	6	8	6	6
5	6	3	10	4
6	7	1	0	1
7	6	1	3	4
8	7	1	3	0
9	2	0	6	1
10	2	1	7	1
10-15	13	2	17	0
Over 15	<u>17</u>	<u>0</u>	<u>13</u>	<u>0</u>
Total	<u>176</u>	<u>102</u>	<u>148</u>	<u>111</u>

TABLE 3.9
DERAILMENTS AND CASUALTIES BY PROVINCE
1985 and 1986

	1985			1986		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	12	0	0	4	0	1
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	6	0	0	7	0	0
New Brunswick	9	0	2	11	0	2
Quebec	31	0	0	53	0	0
Ontario	84	0	8	85	0	8
Manitoba	15	0	2	14	0	1
Saskatchewan	26	0	5	13	0	3
Alberta	40	1	5	32	0	0
British Columbia	55	0	0	40	0	6
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>278</u>	<u>1</u>	<u>22</u>	<u>259</u>	<u>0</u>	<u>21</u>

SECTION 4 Crossing Accidents

SECTION 4

CROSSING ACCIDENTS

Accidents

A crossing accident is one where any unit of rolling stock on the rails strikes or is struck by a user of a public, private or farm crossing, and damage or injury results. All accidents at public crossings are reportable, private or farm crossings being reportable only if they involve a casualty/dangerous commodity (D.C.)/property damage in excess of \$750 for mainline operations.

There were a total of 525 crossing accidents reported to the Canadian Transport Commission in 1986 which is an all time low. The 1986 total represented a sharp decline of 13.4% from the previous year. This decline can partly be explained by increased recognition of the risks associated with drinking and driving, continuing engineering improvements and ongoing driver awareness programs. Since private and farm crossings are only reportable if they involve a casualty/D.C., the majority of reportable crossing accidents are those at public (highway) crossings. There were 497 such public crossing accidents in 1986, with accidents at crossings equipped with automated warnings slightly outnumbering those at crossings with passive warnings. This is in contrast to the actual number of public highway/railway grade crossings in Canada; in 1986 crossings equipped with passive warnings outnumbered those equipped with automated warnings by a ratio of 7:3 (Fig. 4.2). However, crossings with automated warnings have much greater train and vehicular traffic than crossings with passive warnings and this produces greater accident risk. Table 4.2 is a breakdown of crossing accidents by protection type.

The provinces of Ontario and Quebec together accounted for 59% of the 497 public crossing accidents in 1986. These two provinces also accounted for 55% of all Canadian motor vehicle registrations and just over one-third of the some 27,200 public highway/railway crossings in Canada. The number of accidents at public crossings is shown by province in Fig. 4.3(a). There were approximately two accidents for every 100 crossings in Canada as a whole. Quebec, B.C. and Ontario had values well above the national average whereas accident ratios for the Atlantic and the Prairie provinces were well below the value for Canada.

In 1986, crossings equipped with passive warnings accounted for 71% of the total public crossings in Canada. The accident ratios with respect to public crossings equipped with automated and passive warnings are shown in Fig. 4.3(b). The values for Canada were 3.3 and 1.2 accidents respectively for every 100 crossings. However, crossings with passive warnings are not used as frequently as crossings with automated warnings. Looking at the accident ratios at crossings equipped with automated warnings therefore, as a better indicator of relative safety performance, the Atlantic provinces as a whole had the best record in 1986 followed by Manitoba. Ontario's record was superior or comparable to the other provinces even though it accounts for the largest number of crossings equipped with automated warnings in Canada.

Owing to the unpredictable driving conditions during the winter season, this period is the most critical for crossing accidents: the months of January, February and December accounted for one-third of all reported crossing accidents in 1986. Fig. 4.4 illustrates the fluctuation in crossing accidents by time of year. The minor peaks during certain summer/fall months are presumably due to the increased volume of holiday traffic.

Two out of every three crossing accidents occur during the daytime. Fig. 4.5, which shows the variation in crossing accidents by time of day, indicates a higher probability for an accident occurring during the mid-day hours owing to the large volume of commercial and private motor-vehicle traffic during this time period. Accidents appear to taper off by mid-afternoon after which the 'after-office' rush hour accounts for another very high peak in crossing accidents. The morning rush hour is not as critical since drivers are presumably more alert at this time. Accidents during the late evening hours may be attributable to factors such as fatigue and alcohol consumption. The numbers are fairly constant during these hours and there is a minor peak around midnight/1.00 a.m. at which time late night businesses close; accidents then drastically drop in number until the morning.

Crossing accidents in which a train strikes the vehicle outnumber those accidents where the vehicle strikes the train by 3 to 2. Part of the explanation lies in the fact that motor vehicle drivers are apt to be impatient and rather than wait for the approaching train, they may be tempted to take chances when a crossing is clear of rolling stock. Fig. 4.6 is a graphical representation of 1986 public crossing accidents by impact type. The figure illustrates the percentage breakdown of impact type by day and night, and then takes the breakdown one step further by subdividing the above accidents into those that occurred at crossings equipped with automated and passive warnings respectively.

Some 85% of the rolling stock involved in crossing accidents were freight movements. Passenger trains accounted for another 11% and the rest involved movements of track motor cars and maintenance of way equipment. In terms of train-mile performance, freight movements normally account for four times the volume of passenger traffic. Crossing accidents by vehicle type are presented in Table 4.5. A little under one-fourth of all vehicle registrations are trucks and buses (75% being passenger automobiles) and yet nearly one-third of all crossing accidents involved trucks.

The risk of dangerous commodities (D.C.) being involved in a crossing accident is considerably less than that in a collision or derailment. Over the years, D.C. related crossing accidents have always amounted to less than 2% of the total reportable crossing accident totals. Crossing accidents also generally do not result in a derailment of rolling stock. There were 10 such cases in 1986 as compared to 11 in 1985.

The number of crossing accidents per million motor vehicle registrations declined from 41 in 1985 to 35 in 1986. Crossing accidents per million train-miles also dropped from 7.66 in 1985 to 6.66 in 1986. Accident rates had actually levelled off between 1983-1985 after the fairly high values recorded in the years 1979-1982. A breakdown of 1986 crossing accidents by type

of traffic gives the following: there were 3.92 crossing accidents involving passenger trains per million passenger train-miles; the corresponding figure for accidents involving freight trains per million freight train-miles was 7.03.

Casualties

Fig. 4.7 illustrates an interesting fact: the majority of crossing accidents do not result in casualties. In 1986, only 7% of all crossing accidents resulted in at least one fatality while an additional 32% resulted in injury. In the years 1984 and 1985 there were 51 and 50 fatality related crossing accidents, and these resulted in 70 and 58 annual fatalities respectively. In 1986, however, there were only 39 fatality related accidents resulting in an all-time low of 46 fatalities. Fig. 4.8 shows the frequency distribution for crossing fatalities and the accidents causing them for the years 1984-1985. For example in 1986 there were 36 single fatality accidents, 1 accident with 2 fatalities and 2 accidents with 4 fatalities each; in 1985, however, there were 42 single fatality accidents and 8 accidents with 2 fatalities each. The very high figure in 1984 is due to the large number of multiple fatality accidents as illustrated in Fig. 4.8.

Crossing accidents normally account for nearly half of all railway related fatalities. In 1986, however, crossing accidents accounted for 40% of railway fatalities owing to the sudden increase in train collision fatalities as a result of the Hinton accident. The majority of crossing accident fatalities are motor vehicle occupants and not railway employees or passengers. In 1986, motor vehicle occupants accounted for 87% of all crossing fatalities, the remainder being mainly pedestrians. Motor vehicle occupants also accounted for some 87% of total injuries at railway crossings. Injuries dropped sharply by 27% from 335 in 1985 to 246 in 1986. However, a large portion of this difference is attributable to four multiple-injury accidents in 1985 involving passenger trains. (Together, these 1985 accidents accounted for 2 fatalities and 54 injuries. Of these injuries, 49 were to railway passengers).

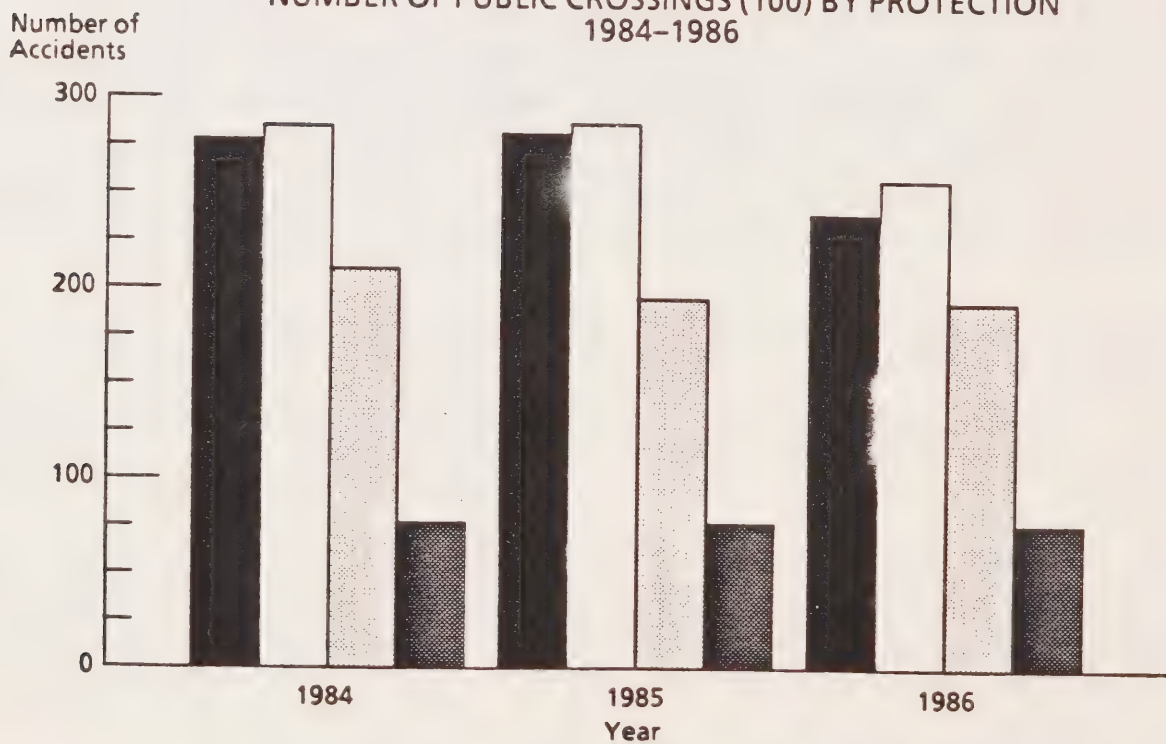
Figure 4.1

NUMBER OF CROSSING ACCIDENTS 1979-1986



Figure 4.2

ACCIDENTS AT PUBLIC CROSSINGS AND NUMBER OF PUBLIC CROSSINGS (100) BY PROTECTION 1984-1986



Legend:
 Accidents with Passive Warnings
 Accidents with Automated Warnings
 Number of Passive Warnings (100)
 Number of Automated Warnings (100)

Figure 4.3(a)

TOTAL PUBLIC CROSSING ACCIDENTS/
TOTAL NUMBER OF PUBLIC CROSSINGS
1986

Accidents per
100 Crossings

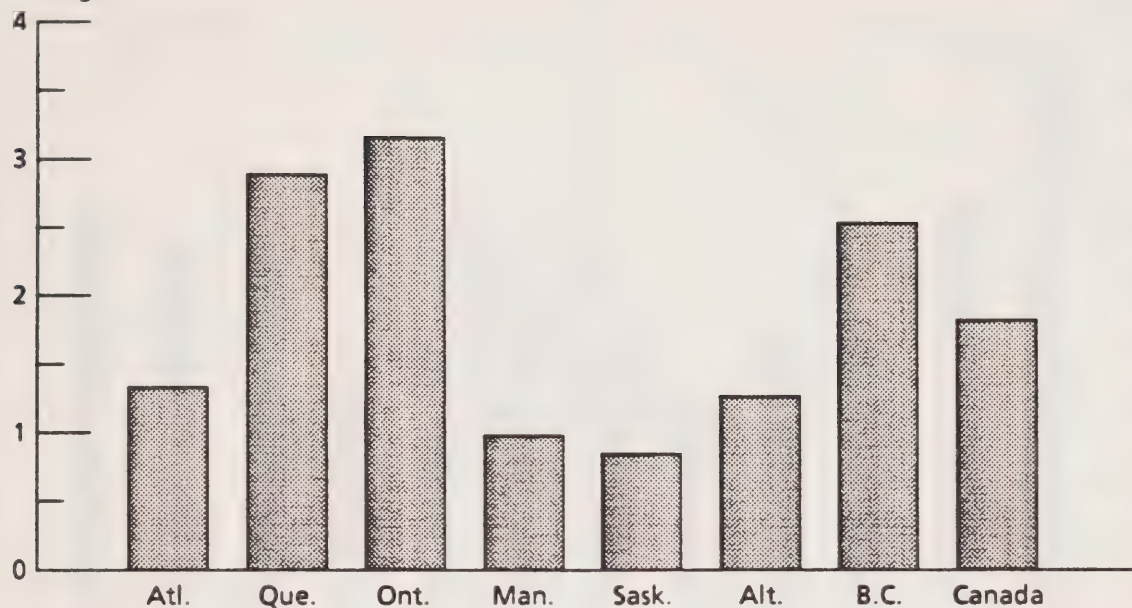


Figure 4.3(b)

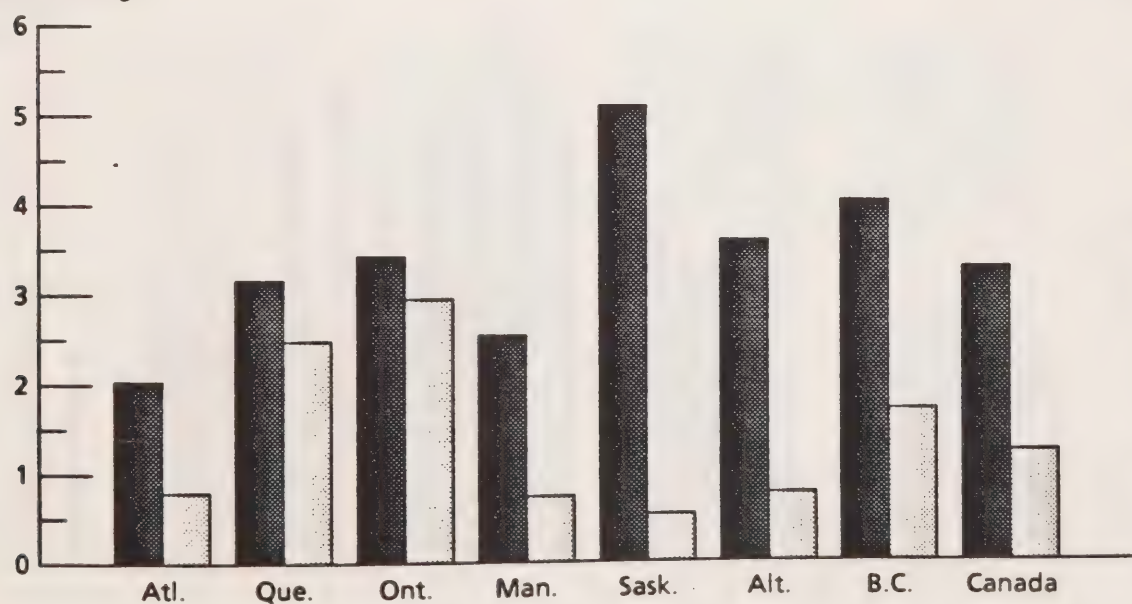
CROSSING ACCIDENTS AT PUBLIC CROSSINGS WITH AUTOMATED WARNINGS/
NUMBER OF PUBLIC CROSSINGS WITH AUTOMATED WARNINGS

AND

CROSSING ACCIDENTS AT PUBLIC CROSSINGS WITH PASSIVE WARNINGS/
NUMBER OF PUBLIC CROSSINGS WITH PASSIVE WARNINGS

1986

Accidents per
100 Crossings



Legend:



Equipped with
Automated Warnings



Equipped with
Passive Warnings

Figure 4.4

TOTAL CROSSING ACCIDENTS BY MONTH 1985-1986

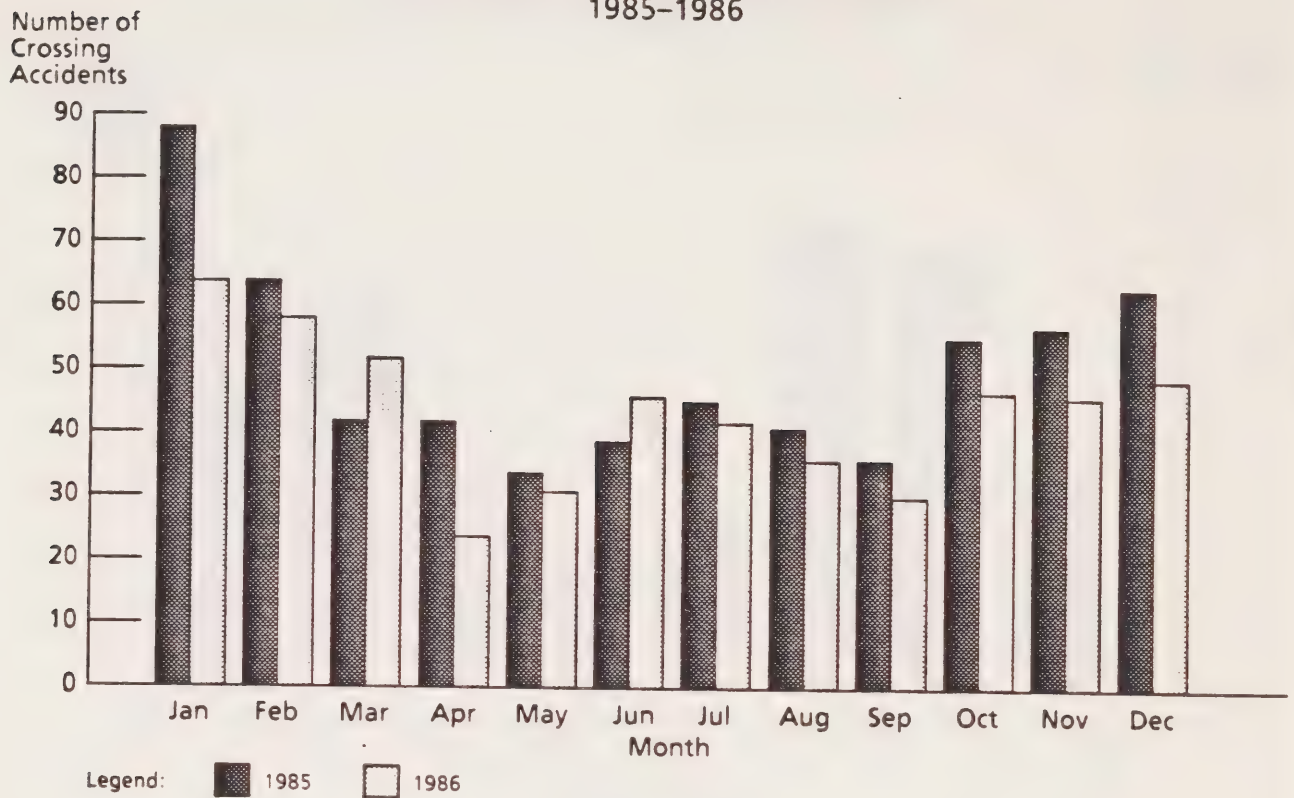


Figure 4.5

AVERAGE NUMBER OF CROSSING ACCIDENTS BY TIME OF DAY 1985-1986

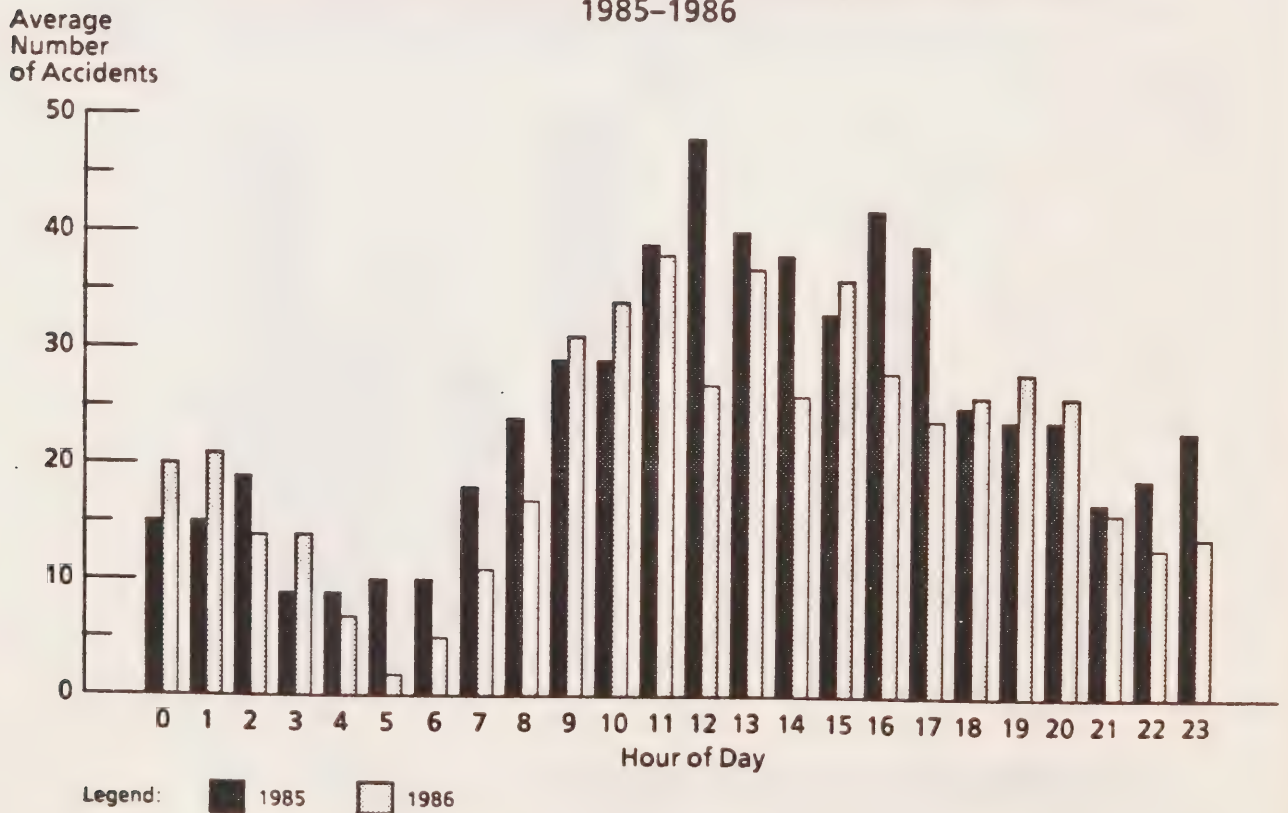
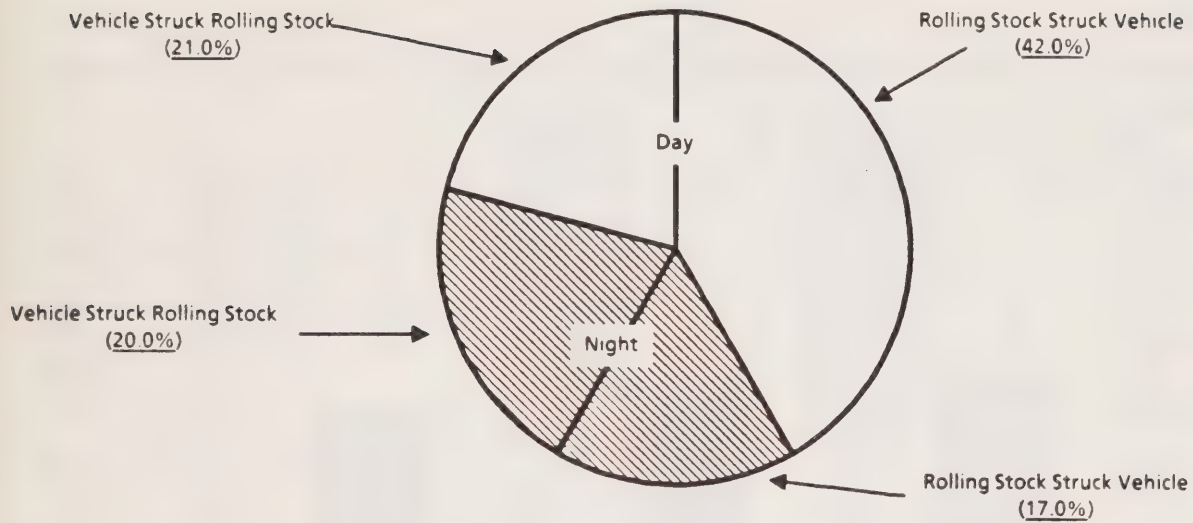


Figure 4.6

PUBLIC CROSSING ACCIDENTS BY IMPACT
1986



497

Public Crossing Accidents for which
Time of Occurrence Available

(105)

Day

(102)

Night

(207)

Day

(83)

Night

Percentage

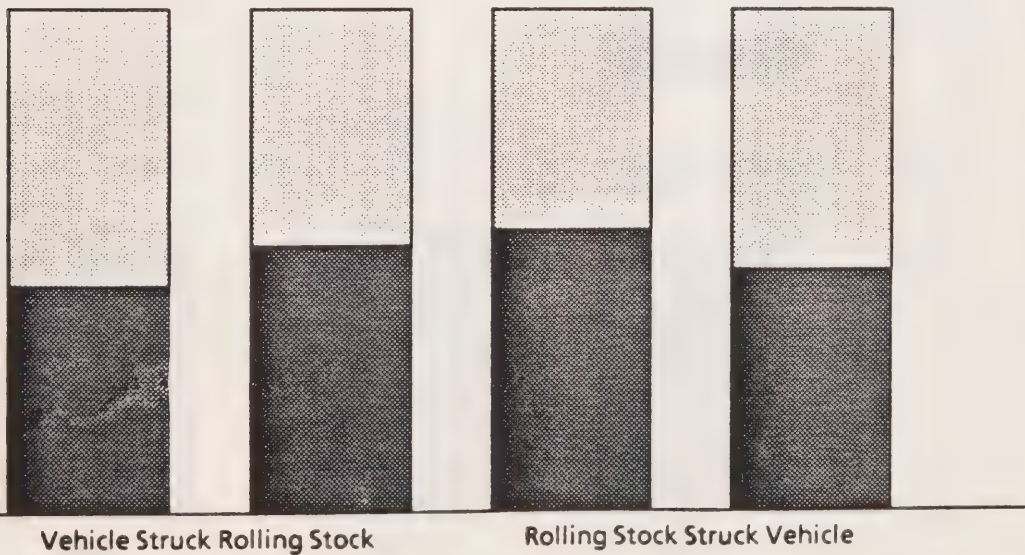
100

75

50

25

0



Legend:



Equipped with
Automated Warnings



Equipped with
Passive Warnings

Figure 4.7

TOTAL CROSSING ACCIDENTS AND CASUALTY CROSSING ACCIDENTS 1984-1986

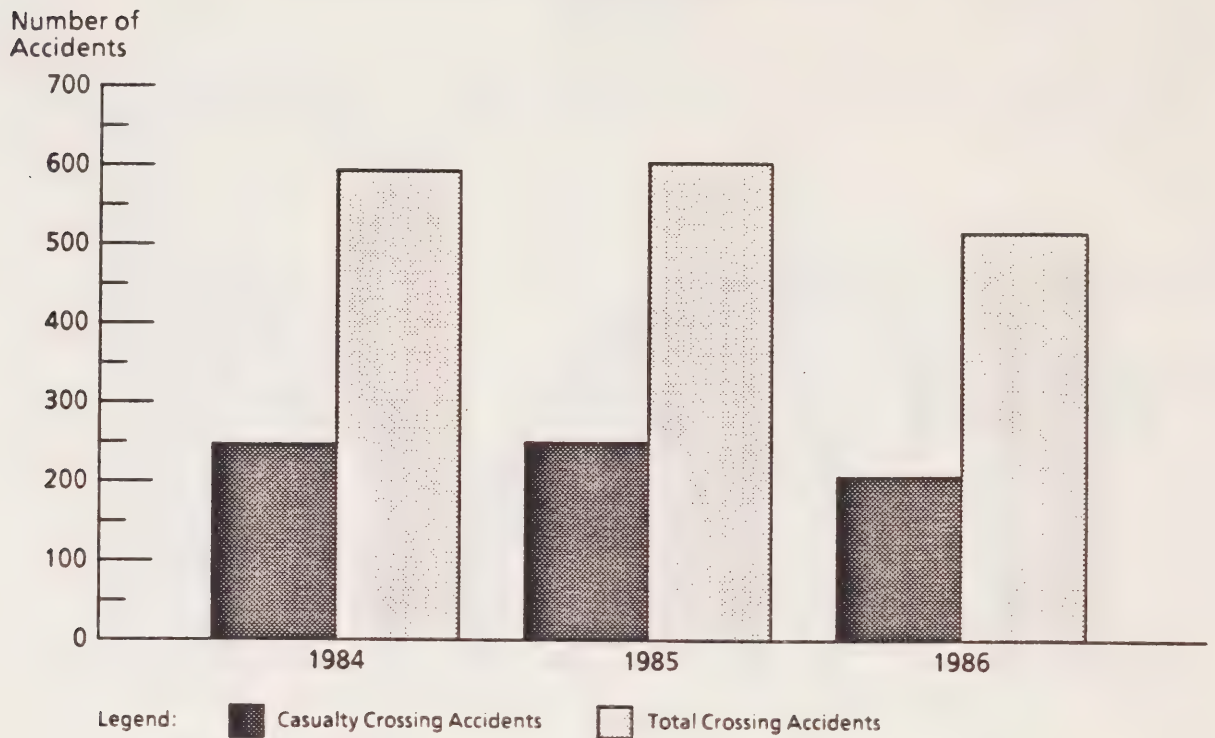


Figure 4.8

FREQUENCY DISTRIBUTION OF FATALITIES AND CROSSING ACCIDENTS CAUSING THEM 1984-1986

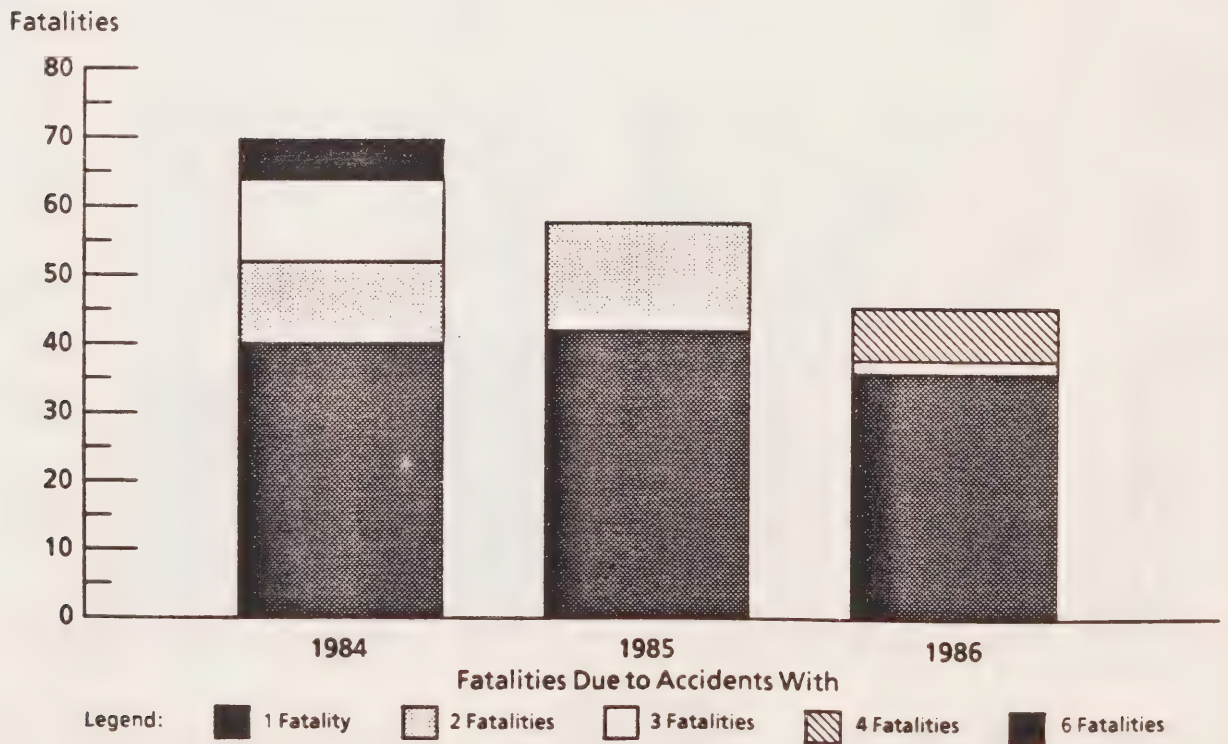


TABLE 4.1
CROSSING ACCIDENTS BY REPORTING RAILWAY
1986

	CN	CP	OTHER	ALL RAILWAYS TOTAL	%
<u>Crossing Accidents by Type of Crossing</u>					
Public-Equipped with Automated Warnings	145	101	11	257	49
Public-Equipped with Passive Warnings	124	106	10	240	46
Farm	0	3	0	3	0
Private	<u>13</u>	<u>10</u>	<u>2</u>	<u>25</u>	<u>5</u>
Total Crossing Accidents	<u>282</u>	<u>220</u>	<u>23</u>	<u>525</u>	<u>100</u>
<u>Crossing Accidents by Province</u>					
Newfoundland	2	0	0	2	0
Prince Edward Island	3	0	0	3	1
Nova Scotia	9	3	2	14	3
New Brunswick	8	6	0	14	3
Quebec	56	36	4	96	18
Ontario	122	74	16	212	40
Manitoba	13	21	0	34	7
Saskatchewan	29	31	0	60	11
Alberta	27	24	0	51	10
British Columbia	13	25	1	39	7
Yukon	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Crossing Accidents	<u>282</u>	<u>220</u>	<u>23</u>	<u>525</u>	<u>100</u>
<u>Crossing Accidents by Time of Year</u>					
January, February and December	88	79	4	171	33
March to November	<u>194</u>	<u>141</u>	<u>19</u>	<u>354</u>	<u>67</u>
Total Crossing Accidents	<u>282</u>	<u>220</u>	<u>23</u>	<u>525</u>	<u>100</u>

TABLE 4.1 (CONTINUED)
CROSSING ACCIDENTS BY REPORTING RAILWAY
1986

	CN	CP	OTHER	ALL RAILWAYS TOTAL	%
<u>Crossing Accidents by Time of Day</u>					
Day	170	151	9	330	63
Night	106	66	13	185	35
Unknown	<u>6</u>	<u>3</u>	<u>1</u>	<u>10</u>	<u>2</u>
Total Crossing Accidents	<u>282</u>	<u>220</u>	<u>23</u>	<u>525</u>	<u>100</u>
<u>Crossing Accidents by Type of Collision</u>					
Rolling Stock Struck Vehicle	171	131	10	312	59
Vehicle Struck Rolling Stock	<u>111</u>	<u>89</u>	<u>13</u>	<u>213</u>	<u>41</u>
Total Crossing Accidents	<u>282</u>	<u>220</u>	<u>23</u>	<u>525</u>	<u>100</u>
<u>Crossing Accidents by Type of Rolling Stock</u>					
Passenger	36	13	0	49	9
Rail Diesel Car	6	4	0	10	2
Freight	226	193	23	442	84
Plow	3	3	0	6	1
Track Motor Car	8	7	0	15	3
Maintenance of Way Equipment	<u>3</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>1</u>
Total Crossing Accidents	<u>282</u>	<u>220</u>	<u>23</u>	<u>525</u>	<u>100</u>
<u>Crossing Accidents by Type of Casualty</u>					
Resulting in Injury	90	69	9	168	32
Resulting in Fatality	22	15	2	39	7
Non-Casualty	<u>170</u>	<u>136</u>	<u>12</u>	<u>318</u>	<u>61</u>
Total Crossing Accidents	<u>282</u>	<u>220</u>	<u>23</u>	<u>525</u>	<u>100</u>

TABLE 4.2
NUMBER OF CROSSING ACCIDENTS BY REPORTING RAILWAY
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>CN</u>								
Public Crossings	518	404	399	361	285	322	310	269
Private Crossings	31	21	25	23	24	18	23	13
Farm Crossings	<u>5</u>	<u>3</u>	<u>5</u>	<u>7</u>	<u>1</u>	<u>5</u>	<u>4</u>	<u>0</u>
Total CN	<u>554</u>	<u>428</u>	<u>429</u>	<u>391</u>	<u>310</u>	<u>345</u>	<u>337</u>	<u>282</u>
<u>CP</u>								
Public Crossings	290	303	266	245	211	217	222	207
Private Crossings	18	12	13	7	3	8	7	10
Farm Crossings	<u>2</u>	<u>9</u>	<u>7</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>3</u>
Total CP	<u>310</u>	<u>324</u>	<u>286</u>	<u>253</u>	<u>216</u>	<u>226</u>	<u>232</u>	<u>220</u>
<u>Other</u>								
Public Crossings	67	70	46	44	40	24	36	21
Private Crossings	6	4	2	1	0	1	1	2
Farm Crossings	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other	<u>73</u>	<u>74</u>	<u>48</u>	<u>47</u>	<u>41</u>	<u>25</u>	<u>37</u>	<u>23</u>
<u>All Railways</u>								
Public Crossings	875	777	711	650	536	563	568	497
Private Crossings	55	37	40	31	27	27	31	25
Farm Crossings	<u>7</u>	<u>12</u>	<u>12</u>	<u>10</u>	<u>4</u>	<u>6</u>	<u>7</u>	<u>3</u>
Total All Railways	<u>937</u>	<u>826</u>	<u>763</u>	<u>691</u>	<u>567</u>	<u>596</u>	<u>606</u>	<u>525</u>

TABLE 4.3
CROSSING ACCIDENT CASUALTIES BY REPORTING RAILWAY
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Fatalities</u>								
CN	71	44	48	43	27	49	37	25
CP	25	34	23	30	30	20	17	19
Other	<u>2</u>	<u>5</u>	<u>11</u>	<u>4</u>	<u>2</u>	<u>1</u>	<u>4</u>	<u>2</u>
Total Fatalities	<u>98</u>	<u>83</u>	<u>82</u>	<u>77</u>	<u>59</u>	<u>70</u>	<u>58</u>	<u>46</u>
<u>Injuries</u>								
CN	267	256	244	195	165	162	171	134
CP	137	141	180	138	96	106	149	101
Other	<u>48</u>	<u>38</u>	<u>27</u>	<u>24</u>	<u>25</u>	<u>21</u>	<u>15</u>	<u>11</u>
Total Injuries	<u>452</u>	<u>435</u>	<u>451</u>	<u>357</u>	<u>286</u>	<u>289</u>	<u>335</u>	<u>246</u>

TABLE 4.4
CROSSING ACCIDENTS BY TYPE OF PROTECTION
1985 and 1986

	1985		1986	
	<u>Accidents</u>	<u>Crossings</u>	<u>Accidents</u>	<u>Crossings</u>
Public Crossings				
Reflectorized Crossing Signs	281	17,991	240	19,111
Other				
Passive Warnings	<u>0</u>	<u>1,549</u>	<u>0</u>	<u>289</u>
Sub-Total	<u>281</u>	<u>19,540</u>	<u>240</u>	<u>19,400</u>
Flashing Lights and Bells	230	6,562	206	6,618
Gates	56	1,084	50	1,133
Other				
Automated Warnings	<u>1</u>	<u>38</u>	<u>1</u>	<u>21</u>
Sub-Total	<u>287</u>	<u>7,684</u>	<u>257</u>	<u>7,772</u>
Total Public Crossings	568	<u>27,224</u>	497	<u>27,172</u>
Private Crossings	31		25	
Farm Crossings	<u>7</u>		<u>3</u>	
Total Crossings	<u>606</u>		<u>525</u>	

TABLE 4.5
CROSSING ACCIDENTS BY TYPE OF VEHICLE
1986

	Accidents: Rolling Stock Striking Vehicle		Accidents: Vehicle Striking Rolling Stock		Accidents: All		Motor Vehicle Registration
	No.	%	No.	%	No.	%	%
Passenger automobiles	188	60	148	69	336	64	75.2
Trucks and buses	113	36	59	28	172	33	21.3
Motorcycles and bicycles	3	1	6	3	9	2	3.1
Pedestrians and other persons	<u>8</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>8</u>	<u>1</u>	<u>0.4</u>
Total	<u>312</u>	<u>100</u>	<u>213</u>	<u>100</u>	<u>525</u>	<u>100</u>	<u>100.0</u>

* Based on 1985 data.

TABLE 4.6
CROSSING ACCIDENTS BY TYPE OF CROSSING
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Casualty Accidents</u>								
Public Crossings	350	318	287	240	214	215	213	180
Private Crossings	55	37	29	31	27	27	31	24
Farm Crossings	<u>7</u>	<u>12</u>	<u>11</u>	<u>10</u>	<u>4</u>	<u>6</u>	<u>7</u>	<u>3</u>
Sub-total	<u>412</u>	<u>367</u>	<u>327</u>	<u>281</u>	<u>245</u>	<u>248</u>	<u>251</u>	<u>207</u>
<u>Non-Casualty Accidents</u>								
Public Crossings	525	459	436	410	322	348	355	317
Private Crossings	0	0	0	0	0	0	0	1
Farm Crossings	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-total	<u>525</u>	<u>459</u>	<u>436</u>	<u>410</u>	<u>322</u>	<u>348</u>	<u>355</u>	<u>318</u>
<u>All Accidents</u>								
Public Crossings	875	777	723	650	536	563	568	497
Private Crossings	55	37	29	31	27	27	31	25
Farm Crossings	<u>7</u>	<u>12</u>	<u>11</u>	<u>10</u>	<u>4</u>	<u>6</u>	<u>7</u>	<u>3</u>
Total Crossing Accidents	<u>937</u>	<u>826</u>	<u>763</u>	<u>691</u>	<u>567</u>	<u>596</u>	<u>606</u>	<u>525</u>

TABLE 4.7
CROSSING CASUALTIES BY TYPE OF PERSON
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Fatalities</u>								
Motor Vehicle Occupants	90	70	78	72	55	67	52	40
Railway Employees*	0	1	1	1	0	2	1	2
Railway Passengers	0	0	0	0	0	0	0	0
Pedestrians	<u>8</u>	<u>12</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>1</u>	<u>5</u>	<u>4</u>
Total Fatalities	<u>98</u>	<u>83</u>	<u>82</u>	<u>77</u>	<u>59</u>	<u>70</u>	<u>58</u>	<u>46</u>
<u>Injuries</u>								
Motor Vehicle Occupants	402	341	355	290	244	255	259	213
Railway Employees	39	40	42	30	30	20	17	22
Railway Passengers	3	45	51	34	5	7	51	8
Pedestrians	<u>8</u>	<u>9</u>	<u>3</u>	<u>3</u>	<u>7</u>	<u>7</u>	<u>8</u>	<u>3</u>
Total Injuries	<u>452</u>	<u>435</u>	<u>451</u>	<u>357</u>	<u>286</u>	<u>289</u>	<u>335</u>	<u>246</u>

* 1984 data includes 1 contractor

TABLE 4.8
CASUALTIES BY TYPE OF CROSSING PROTECTION
1985 and 1986

Type of Crossing	Injuries		Fatalities	
	1985	1986	1985	1986
Public Crossings				
Reflectorized Crossing Signs	140	115	19	18
Other				
Passive Warnings	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-Total	<u>140</u>	<u>115</u>	<u>19</u>	<u>18</u>
Flashing Lights and Bells	110	88	26	14
Gates	20	9	7	11
Other				
Automated Warnings	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-Total	<u>132</u>	<u>97</u>	<u>33</u>	<u>25</u>
Total Public Crossings	272	212	52	43
Private Crossings	45	31	5	3
Farm Crossings	<u>18</u>	<u>3</u>	<u>1</u>	<u>0</u>
Total Crossings	<u>335</u>	<u>246</u>	<u>58</u>	<u>46</u>

TABLE 4.9
CROSSING ACCIDENTS: MISCELLANEOUS RATIOS
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
Total Accidents	937	826	763	691	567	596	606	525
Cases with Derailment	19	20	13	11	18	12	11	10
%	2.0	2.4	1.7	1.6	3.2	2.0	1.8	1.9
Cases with D.C.	2	11	4	8	9	10	8	6
%	0.2	1.3	0.5	1.2	1.6	1.7	1.3	1.1
Millions of Motor Vehicle Registrations (MMVR)	13.3	13.7	13.9	14.3	14.6	14.4	14.8	15.1*
Crossing Acc./MMVR	70	60	55	48	39	41	41	35*
Million Train-Miles (MTM)	91.6	89.2	85.8	73.9	76.0	81.3	79.1	78.8*
Crossing Acc./MTM	10.23	9.26	8.89	9.35	7.46	7.33	7.66	6.66*

* Estimated

TABLE 4.10
CROSSING ACCIDENTS AND CASUALTIES BY PROVINCE
1985 and 1986

	1985			1986		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	4	2	0	2	0	0
Prince Edward Island	3	0	1	3	0	0
Nova Scotia	17	0	13	14	0	9
New Brunswick	17	2	9	14	2	9
Quebec	119	19	62	96	13	45
Ontario	200	18	98	212	20	92
Manitoba	38	1	21	34	0	29
Saskatchewan	68	7	28	60	6	31
Alberta	84	9	65	51	4	21
British Columbia	55	0	38	39	1	10
Yukon	0	0	0	0	0	0
North West Territories	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>606</u>	<u>58</u>	<u>335</u>	<u>525</u>	<u>46</u>	<u>246</u>

**SECTION 5 Track Motor Car and Maintenance of
Way Equipment Collisions/Derailments**

SECTION 5

TRACK MOTOR CAR AND MAINTENANCE OF WAY EQUIPMENT COLLISIONS/DERAILMENTS

Accidents

This section tabulates collisions/derailments involving on-track work equipment such as track motor cars and maintenance of way equipment.

Collisions between or involving such equipment numbered 20 in 1986, a sharp decline of 25.9% from 1985.

There were 7 on-track equipment derailments in 1986, down from 12 such accidents in 1985. The majority of these cases involved track motor cars.

Casualties

There were no fatalities as a result of on-track equipment collisions/derailments in 1986; there were, however, 26 injuries. In 1985 such accidents accounted for 2 fatalities and 53 injuries.

TABLE 5.1
NUMBER OF TMC/MWE* COLLISIONS AND CASUALTIES** BY REPORTING RAILWAY
1985 and 1986

	Collisions			Casualties			
	1985	1986	% Change	Injured		Killed	
				1985	1986	1985	1986
<u>TMC-TMC, TMC-MWE and MWE-MWE</u>							
CN	3	1		8	1	0	0
CP	4	4		20	3	0	0
Other	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-total	<u>7</u>	<u>5</u>		<u>28</u>	<u>4</u>	<u>0</u>	<u>0</u>
<u>TMC-Train and MWE-Train</u>							
CN	13	9		4	4	1	0
CP	7	6		3	8	1	0
Other	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-total	<u>20</u>	<u>15</u>		<u>7</u>	<u>12</u>	<u>2</u>	<u>0</u>
<u>Total TMC and MWE</u>							
CN	16	10	-37.5	12	5	1	0
CP	11	10	-9.1	23	11	1	0
Other	<u>0</u>	<u>0</u>	-	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC and MWE	<u>27</u>	<u>20</u>	-25.9	<u>35</u>	<u>16</u>	<u>2</u>	<u>0</u>

* TMC: Track Motor Car

MWE: Maintenance of Way Equipment

** All casualties are employees

TABLE 5.2
TOTAL TMC/MWE* COLLISIONS AND CASUALTIES** BY REPORTING RAILWAY
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Collisions</u>								
CN	22	25	34	30	21	17	16	10
CP	9	16	16	12	14	9	11	10
Other	<u>5</u>	<u>8</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>0</u>
Total TMC and MWE Collisions	<u>36</u>	<u>49</u>	<u>53</u>	<u>43</u>	<u>36</u>	<u>28</u>	<u>27</u>	<u>20</u>
<u>Casualties</u>								
<u>Fatalities</u>								
CN	0	1	0	4	0	0	1	0
CP	0	1	1	0	0	0	1	0
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>0</u>	<u>2</u>	<u>1</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>
<u>Injuries</u>								
CN	30	25	65	22	30	24	12	5
CP	19	18	14	8	18	13	23	11
Other	<u>8</u>	<u>17</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Injuries	<u>57</u>	<u>60</u>	<u>83</u>	<u>30</u>	<u>48</u>	<u>37</u>	<u>35</u>	<u>16</u>

* TMC: Track Motor Car

MWE: Maintenance of Way Equipment

** All casualties are employees

TABLE 5.3
NUMBER OF TMC/MWE DERAILMENTS AND CASUALTIES** BY REPORTING RAILWAY
1985 and 1986

	Derailments			Casualties			
	1985	1986	% Change	Injuries		Fatalities	
				1985	1986	1985	1986
<hr/>							
<u>TMC</u>							
CN	3	1		6	3	0	0
CP	8	4		11	6	0	0
Other	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC	<u>11</u>	<u>5</u>		<u>17</u>	<u>9</u>	<u>0</u>	<u>0</u>
<u>MWE</u>							
CN	0	1		0	0	0	0
CP	1	1		1	1	0	0
Other	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total MWE	<u>1</u>	<u>2</u>		<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>
<u>Total TMC and MWE</u>							
CN	3	2	-33.3	6	3	0	0
CP	9	5	-44.4	12	7	0	0
Other	<u>0</u>	<u>0</u>	-	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC and MWE	<u>12</u>	<u>7</u>	-41.7	<u>18</u>	<u>10</u>	<u>0</u>	<u>0</u>

* TMC: Track Motor Car

MWE: Maintenance of Way Equipment

** All casualties are employees

TABLE 5.4
TOTAL TMC/MWE* DERAILMENTS AND CASUALTIES** BY REPORTING RAILWAY
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Derailments</u>								
CN	19	6	2	4	3	5	3	2
CP	11	25	11	12	14	12	9	5
Other	<u>2</u>	<u>1</u>	<u>3</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC and MWE Derailments	<u>32</u>	<u>32</u>	<u>16</u>	<u>18</u>	<u>17</u>	<u>17</u>	<u>12</u>	<u>7</u>
<u>Casualties</u>								
<u>Fatalities</u>								
CN	1	0	0	0	0	0	0	0
CP	0	0	0	0	1	0	0	0
Other	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Injuries</u>								
CN	27	8	2	5	6	3	6	3
CP	14	31	12	20	20	17	12	7
Other	<u>7</u>	<u>1</u>	<u>3</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Injuries	<u>48</u>	<u>40</u>	<u>17</u>	<u>31</u>	<u>26</u>	<u>20</u>	<u>18</u>	<u>10</u>

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment
** All casualties are employees

TABLE 5.5
TMC/MWE* COLLISIONS/DERAILMENTS AND CASUALTIES** BY PROVINCE
1985 and 1986

	1985			1986		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	0	0	0	0	0	0
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	0	0	0	1	0	1
New Brunswick	1	0	2	0	0	0
Quebec	3	1	6	3	0	1
Ontario	9	0	6	12	0	8
Manitoba	4	0	11	4	0	5
Saskatchewan	3	0	3	0	0	0
Alberta	4	1	4	1	0	3
British Columbia	15	0	21	6	0	8
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>39</u>	<u>2</u>	<u>53</u>	<u>27</u>	<u>0</u>	<u>26</u>

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment
** All casualties are employees

SECTION 6 Train Service Accidents

SECTION 6

TRAIN SERVICE ACCIDENTS

Accidents

Train Service Accidents from 1981 onwards, as shown in this report, represent persons (including trespassers) sustaining injuries or dying as a result of being struck by rolling stock or employees injured while in the process of entraining/detraining rolling stock.

In 1986, there were 433 such accidents which is considerably lower (18.0%) than the figure in 1985. Three-fourths of these involved railway employees getting off/on rolling stock.

Casualties

Train Service Accidents accounted for 43 fatalities in 1986 (this was 37% of all railway accident fatalities). This was a sharp decrease of 29.5% from the 1985 total of 61 fatalities. Most of these fatalities were trespassers and suicides. This relatively large number of deaths should not be ignored; however, it is difficult to deter a determined trespasser or an individual determined to end his/her life on the railway. People intent on committing such acts can find ways of overcoming any railway preventative measures. Train Service Accidents also resulted in 389 injuries in 1986, as compared to 471 in 1985. The majority of these are injuries to employees getting off/on rolling stock.

TABLE 6.1
TRAIN SERVICE ACCIDENTS AND CASUALTIES
1985 and 1986

	1985	1986	% Change
<u>Accidents</u>			
Employees struck by Rolling Stock	25	21	-16.0
Passengers struck by Rolling Stock	2	0	-100.0
Trespassers struck by Rolling Stock	104	86	-17.3
Employees getting off/on Rolling Stock	<u>397</u>	<u>326</u>	-17.9
Total Train Service Accidents	<u>528</u>	<u>433</u>	-18.0
<u>Casualties</u>			
i) <u>Fatalities</u>			
Employees struck by Rolling Stock	3	6	100.0
Contractors struck by Rolling Stock	0	0	-
Passengers struck by Rolling Stock	0	0	-
Trespassers struck by Rolling Stock	58	37	-36.2
Employees getting off/on Rolling Stock	<u>0</u>	<u>0</u>	-
Total Fatalities	<u>61</u>	<u>43</u>	-29.5
ii) <u>Injuries</u>			
Employees struck by Rolling Stock	21	14	-33.3
Contractors struck by Rolling Stock	1	2	100.0
Passengers struck by Rolling Stock	2	0	-100.0
Trespassers struck by Rolling Stock	50	47	-6.0
Employees getting off/on Rolling Stock	<u>397</u>	<u>326</u>	-17.9
Total Injuries	<u>471</u>	<u>389</u>	-17.4

TABLE 6.2
TRAIN SERVICE ACCIDENTS AND CASUALTIES
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Accidents</u>								
Employees struck by								
Rolling Stock	48	32	27	29	35	38	25	21
Passengers struck by								
Rolling Stock	N/A	N/A	1	0	0	0	2	0
Trespassers struck by								
Rolling Stock	82	177	109	91	111	101	104	86
Employees getting off/on								
Rolling Stock	N/A	N/A	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>	<u>397</u>	<u>326</u>
Total Accidents			<u>729</u>	<u>614</u>	<u>703</u>	<u>572</u>	<u>528</u>	<u>433</u>
<u>Casualties</u>								
<u>Fatalities</u>								
Employees struck by								
Rolling Stock	5	6	3	7	6	7	3	6
Contractors struck by								
Rolling Stock	0	0	0	0	0	1	0	0
Passengers struck by Rolling								
Stock	N/A	N/A	1	0	0	0	0	0
Trespassers struck by								
Rolling Stock	51	97	58	50	47	43	58	37
Employees getting off/on								
Rolling Stock	N/A	N/A	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities			<u>62</u>	<u>57</u>	<u>53</u>	<u>51</u>	<u>61</u>	<u>43</u>
<u>Injuries</u>								
Employees struck by								
Rolling Stock	46	25	24	22	30	31	21	14
Contractors struck by								
Rolling Stock	0	0	0	0	0	1	1	2
Passengers struck by Rolling								
Stock	N/A	N/A	0	0	0	0	2	0
Trespassers struck by								
Rolling Stock	34	80	46	40	65	60	50	47
Employees getting off/on								
Rolling Stock	N/A	N/A	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>	<u>397</u>	<u>326</u>
Total Injuries			<u>662</u>	<u>556</u>	<u>652</u>	<u>525</u>	<u>471</u>	<u>389</u>

See Footnote to Table 1.2

TABLE 6.3
TRESPASSERS/SUICIDES BY PROVINCE
1985 and 1986

	1985			1986		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	1	0	1	0	0	0
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	2	1	1	2	1	1
New Brunswick	4	3	1	2	1	1
Quebec	13	11	2	16	7	9
Ontario	47	30	19	39	21	16
Manitoba	5	1	4	4	0	4
Saskatchewan	2	2	0	2	0	2
Alberta	11	3	10	9	4	5
British Columbia	19	7	12	12	3	9
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>104</u>	<u>58</u>	<u>50</u>	<u>86</u>	<u>37</u>	<u>47</u>

SECTION 7 Incidents

SECTION 7

INCIDENTS

Incidents

Incidents include fires, cases of dangerous commodity leakages (not always related to train movements) and other occurrences of a miscellaneous nature. Examples of the latter category include:

- personal injuries to employees or passengers such as striking against or being hit by an obstacle; burns; exposure; sprains, inhalation; etc.
- disruptions of service, washouts, obstructions to track, not resulting in a train accident.
- damage to bridges, culverts, other structures not due to train accidents but including fire damage.

There were 231 fires in 1986 which is a slight increase of 2.2% over the 1985 figure. The majority of fires are on right of way and these in turn are dependent on climatic conditions and to a lesser degree on vandalism.

Dangerous commodity (D.C.) leakage incidents in this section are specifically those that arise in the transportation of dangerous commodities other than due to train accidents. The latter are already included in the figures presented in earlier sections of this report. D.C. leakages totalled 398 in 1986. The considerable increase in recent years relates mainly to more stringent inspection.

All other incidents amounted to 2,697 in 1986, which is slightly less than the 1985 total. 95% of these incidents were miscellaneous injuries sustained by employees and passengers not related to train accidents.

Casualties

D.C. incidents accounted for 20 injuries in 1986. The vast majority of the 2,623 miscellaneous incident injuries were due to "other incidents" as defined earlier. A little over four-fifths of these "other incidents" were personal injuries to employees. Passenger injuries accounted for a further 16%: the majority of these are minor instances such as passengers slipping or losing their balance while the train is in motion, spilling beverages, handling baggage, children playing between cars, using on-board facilities, etc. They also include cases of passengers tripping on station platforms or when entraining/detraining stationary trains. There is no minimum severity for reporting miscellaneous incident injuries; they can range from a loss of a limb to a minor slip or fall.

TABLE 7.1
INCIDENTS AND CASUALTIES
1985 and 1986

	Incidents			Fatalities		Injuries	
	1985	1986	% Change	1985	1986	1985	1986
<u>Fires</u>							
Fires on Right of Way	200	208		0	0	0	0
Fires on Rolling Stock	16	16		0	0	0	1
Fires on Structures	<u>10</u>	<u>7</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fires	<u>226</u>	<u>231</u>	2.2	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
<u>Dangerous Commodity Incidents*</u>	<u>336</u>	<u>398</u>	18.5	<u>0</u>	<u>0</u>	<u>7</u>	<u>20</u>
<u>Other Miscellaneous Incidents</u>							
Involving Employees only	2,088	2,151		1	0	2,095	2,151
Involving Passengers only	498	416		1	0	498	416
Other Incidents**	<u>121</u>	<u>130</u>		<u>5</u>	<u>3</u>	<u>17</u>	<u>35</u>
Total Other Incidents	<u>2,707</u>	<u>2,697</u>	-0.4	<u>7</u>	<u>3</u>	<u>2,610</u>	<u>2,602</u>
Total Incidents	<u>3,269</u>	<u>3,326</u>	1.7	<u>7</u>	<u>3</u>	<u>2,617</u>	<u>2,623</u>

* These totals relate to incidents involving the transportation of dangerous commodities other than in train accidents, many of these leakages being of a minor nature.

1986 data includes 4 non-employee injuries

** 1986 data includes 3 non-employee injuries

1985 data includes 2 vehicle occupant fatalities and 1 vehicle occupant injury

TABLE 7.2
INCIDENTS AND CASUALTIES
1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986
<u>Incidents</u>								
Fires	246	229	221	273	254	202	226	231
D.C.	51	107	157	105	288	418	336	398
All Other**	N/A	N/A	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,564</u>	<u>2,707</u>	<u>2,697</u>
Total Incidents			<u>3,264</u>	<u>3,189</u>	<u>2,925</u>	<u>3,184</u>	<u>3,269</u>	<u>3,326</u>
<u>Casualties</u>								
<u>Fatalities</u>								
Fires	0	0	0	0	0	0	0	0
D.C.	0	0	0	0	0	0	0	0
All Other*	N/A	N/A	<u>5</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>7</u>	<u>3</u>
Total Fatalities			<u>5</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>7</u>	<u>3</u>
<u>Injuries</u>								
Fires	0	0	3	6	5	3	0	1
D.C.***	6	23	1	1	7	5	7	20
All Other*	N/A	N/A	<u>2,861</u>	<u>2,743</u>	<u>2,282</u>	<u>2,494</u>	<u>2,610</u>	<u>2,602</u>
Total Injuries			<u>2,865</u>	<u>2,750</u>	<u>2,294</u>	<u>2,502</u>	<u>2,617</u>	<u>2,623</u>

* 1986 data includes 3 non-employee injuries
 1985 data includes 2 vehicle occupant fatalities and 1 passenger fatality and
 1 vehicle occupant injury
 1984 data includes 2 non-employee injuries
 All other casualties are employees

** See footnotes to table 1.2

*** 1986 data includes 4 non-employee injuries

SECTION 8 Serious Collisions and Derailments

SECTION 8

SERIOUS COLLISIONS AND DERAILMENTS

From the discussions on train collisions and derailments in Sections 2 and 3, it can be seen that 75 collisions and 259 derailments were reported to the Canadian Transport Commission in 1986. However, it is easy to misinterpret these totals. From a purely arithmetical standpoint the above figures could be restated in the following manner. "Everyday Canadian railroads are involved in a collision or a derailment". While not being totally untrue, such a statement could create great concern, as immediately bringing to mind head-on collisions involving passenger trains and multi-car derailments involving the leakage of dangerous commodities (D.C.). Fortunately, such cases are rare. It has been pointed out in the above Sections that the reporting criteria for collisions and derailments have a rather low minimum dollar threshold. It has also been indicated that many of the above accidents reported to the Canadian Transport Commission are of a minor nature: they occur in yards during the course of switching/humping operations and are reportable even if the involved car is a D.C. "empty". In addition, over half of all train derailments involve the derailment of only one or two cars.

In order to place the above figures in perspective, the 1985 Annual Summary introduced the concept of "Serious" collisions and derailments by establishing a set of criteria to indicate the seriousness of such accidents. Serious accidents were defined as involving a fatality; or a major injury (e.g. loss of a limb or an eye, major fracture, etc.); or five or more minor injuries; or a major release of a dangerous good (e.g. resulting in or having high-potential for an explosion, fire or evacuation); or railway property damage in the three categories of more than \$500,000, \$250,000 to \$500,000 and \$100,000 to \$250,000. Some accidents qualify under more than one of these headings and, in such cases, the accident is classified in accordance with the order of criteria given in this list. A property damage threshold of \$100,000 is very modest given, as an example, that the current price of a grain hopper car is \$75,000. However, this property damage figure relates only to damage incurred by the railway itself and does not include third party claims on the railways; while this omission has obvious disadvantages, time delays in determining third party claims would prevent up-to-date reporting. Applying the severity criteria to the 75 collisions and 259 derailments in 1986, one obtains a total of 13 serious collisions and 50 serious derailments.

The number of serious and total collisions/derailments are presented in Table 8.1. It can be seen that during this period only 17% of all collisions fell in the serious category while serious derailments accounted for approximately one-fifth of all derailments (Figure 8.1). The table also indicates an annual average of 64 serious accidents over the past three years. Nearly four-fifths of these serious cases were those involving property damage in excess of \$100,000; however, half of these property damage accidents were under \$250,000. The remaining 21% were those with serious casualty or D.C. involvement. A more detailed breakdown of serious accidents by severity category is presented in Table 8.2

Table 8.3 shows the causes of serious collisions and derailments. The causes of serious collisions are almost entirely operations related as was the case in Section 2. The breakdown of serious derailments by cause is different from Section 3 for the years 1984-1985 in that track conditions feature particularly high on serious cases. In 1986, however, serious derailments were evenly divided between track and equipment related causes.

Although this Section has not examined crossing accidents, it was pointed out in Section 4 that 7% of the 525 crossing accidents in 1986 resulted in a fatality while an additional 32% resulted in injury. Also, only 1% of all crossing accidents had D.C. involvement. In terms of financial damage to railway property and equipment, crossing accidents as a rule, are not as serious as collisions and derailments as it usually the motor vehicle that is heavily damaged or destroyed. Crossing accidents may result in substantial railway damage if an ensuing derailment occurs, but such cases amounted to only 2% of the total crossing accidents reported in 1986.

Figure 8.1

COMPARISON OF SERIOUS COLLISIONS AND DERAILMENTS
WITH TOTAL COLLISIONS AND DERAILMENTS
1984-1986

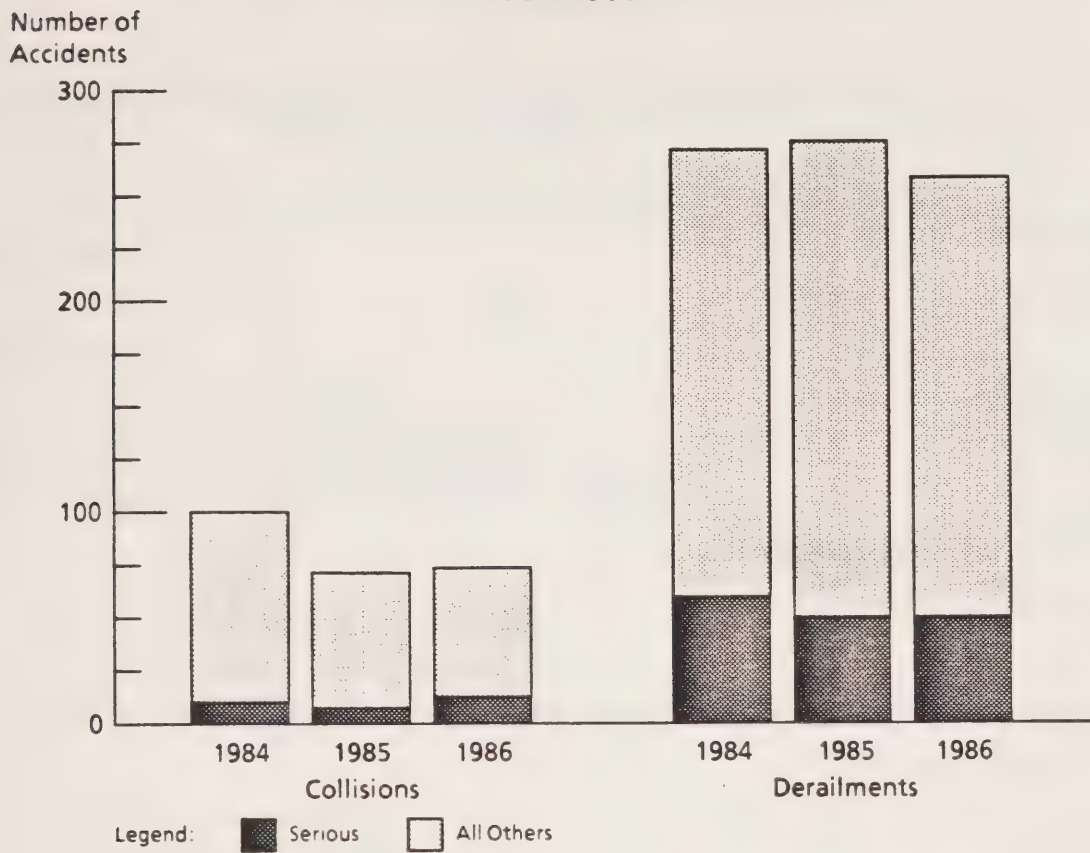


TABLE 8.1
SERIOUS AND TOTAL TRAIN COLLISIONS AND DERAILMENTS
1984 - 1986

	1984	1985	1986
<u>Collisions</u>			
Serious	11	8	13
All	102	72	75
<u>Deraillments</u>			
Serious	60	51	50
All	273	278	259
<u>Collisions and Deraillments</u>			
Serious	71	59	63
All	375	350	334

TABLE 8.2
SERIOUS COLLISIONS AND DERAILMENTS
1984 - 1986

	1984	1985	1986
<u>Collisions</u>			
Fatality	0	0	2
Major injury	5	7	4
Five or more minor injuries	1	0	2
Major dangerous goods release	2	0	0
Property damage exceeding \$500,000	0	0	1
Property damage in range of \$250,000 - \$500,000	1	0	2
Property damage in range of \$100,000 - \$250,000	<u>2</u>	<u>1</u>	<u>2</u>
Total Collisions	<u>11</u>	<u>8</u>	<u>13</u>
<u>Derailments</u>			
Fatality	1	1	0
Major injury	0	2	3
Five or more minor injuries	0	0	0
Major dangerous goods release	3	5	3
Property damage exceeding \$500,000	13	6	14
Property damage in range of \$250,000 - \$500,000	19	12	6
Property damage in range of \$100,000 - \$250,000	<u>24</u>	<u>25</u>	<u>24</u>
Total Derailments	<u>60</u>	<u>51</u>	<u>50</u>
<u>Collisions and Derailments</u>			
Fatality	1	1	2
Major injury	5	9	7
Five or more minor injuries	1	0	2
Major dangerous goods release	5	5	3
Property damage exceeding \$500,000	13	6	15
Property damage in range of \$250,000 - \$500,000	20	12	8
Property damage in range of \$100,000 - \$250,000	<u>26</u>	<u>26</u>	<u>26</u>
Total Collisions and Derailments	<u>71</u>	<u>59</u>	<u>63</u>

TABLE 8.3
SERIOUS COLLISIONS AND DERAILMENTS BY CAUSE
1984 - 1986

	1984		1985		1986	
	Number	%	Number	%	Number	%
<u>Collisions</u>						
Track Related	0	0.0	0	0	0	0
Equipment Related	0	0.0	0	0	1	7.7
Operations Related	9	81.8	7	87.5	11	84.6
Vandalism/Non-						
Company Error	<u>2</u>	<u>18.2</u>	<u>1</u>	<u>12.5</u>	<u>1</u>	<u>7.7</u>
Total Collisions	<u>11</u>	<u>100.0</u>	<u>8</u>	<u>100.0</u>	<u>13</u>	<u>100.0</u>
<u>Derailments</u>						
Track Related	35	58.3	35	68.6	19	38.0
Equipment Related	14	23.3	11	21.6	19	38.0
Operations Related	4	6.7	2	3.9	1	2.0
Other	5	8.3	3	5.9	9	18.0
Vandalism/Non-						
Company Error	<u>2</u>	<u>3.4</u>	<u>0</u>	<u>0.0</u>	<u>2</u>	<u>4.0</u>
Total Derailments	<u>60</u>	<u>100.0</u>	<u>51</u>	<u>100.0</u>	<u>50</u>	<u>100.0</u>

TABLE 8.4
SERIOUS COLLISIONS BY CAUSE BY REPORTING RAILWAY
1984 - 1986

	Main Track			Yard Movements			Total		
	1984	1985	1986	1984	1985	1986	1984	1985	1986
<u>CN</u>									
Operations Related	3	1	4	4	2	4	7	3	8
Equipment Related	0	0	0	0	0	0	0	0	0
Vandalism/Non- Company Error	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>
Total CN	<u>5</u>	<u>2</u>	<u>4</u>	<u>4</u>	<u>2</u>	<u>5</u>	<u>9</u>	<u>4</u>	<u>9</u>
<u>CP</u>									
Operations Related	0	1	2	2	2	1	2	3	3
Equipment Related	0	0	0	0	0	1	0	0	1
Vandalism/Non- Company Error	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total CP	<u>0</u>	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>4</u>
<u>Other</u>									
Operations Related	0	1	0	0	0	0	0	1	0
Equipment Related	0	0	0	0	0	0	0	0	0
Vandalism/Non- Company Error	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>
<u>All Railways</u>									
Operations Related	3	3	6	6	4	5	9	7	11
Equipment Related	0	0	0	0	0	1	0	0	1
Vandalism/Non- Company Error	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>
Total Serious Collisions	<u>5</u>	<u>4</u>	<u>6</u>	<u>6</u>	<u>4</u>	<u>7</u>	<u>11</u>	<u>8</u>	<u>13</u>

TABLE 8.5
SERIOUS DERAILMENTS BY CAUSE BY REPORTING RAILWAY
1985 and 1986

	Main Track			Yard Movements			Total		
	1984	1985	1986	1984	1985	1986	1984	1985	1986
<u>CN</u>									
Track Related	25	22	9	0	3	1	25	25	10
Equipment Related	9	8	12	0	0	1	9	8	13
Operations Related	3	0	1	0	0	0	3	0	1
Other	5	2	4	0	0	0	5	2	4
Vandalism/Non-									
Company Error	<u>1</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>2</u>
Total CN	<u>43</u>	<u>32</u>	<u>28</u>	<u>0</u>	<u>3</u>	<u>2</u>	<u>43</u>	<u>35</u>	<u>30</u>
<u>CP</u>									
Track Related	10	10	7	0	0	0	10	10	7
Equipment Related	4	3	5	0	0	0	4	3	5
Operations Related	1	1	0	0	0	0	1	1	0
Other	0	1	3	0	0	0	0	1	3
Vandalism/Non-									
Company Error	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total CP	<u>16</u>	<u>15</u>	<u>15</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>16</u>	<u>15</u>	<u>15</u>
<u>Other</u>									
Track Related	0	0	2	0	0	0	0	0	2
Equipment Related	1	0	1	0	0	0	1	0	1
Operations Related	0	0	0	0	1	0	0	1	0
Other	0	0	2	0	0	0	0	0	2
Vandalism/Non-									
Company Error	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other	<u>1</u>	<u>0</u>	<u>5</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>5</u>
<u>All Railways</u>									
Track Related	35	32	18	0	3	1	35	35	19
Equipment Related	14	11	18	0	0	1	14	11	19
Operations Related	4	1	1	0	1	0	4	2	1
Other	5	3	9	0	0	0	5	3	9
Vandalism/Non-									
Company Error	<u>2</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>2</u>
Total Serious Derailments	<u>60</u>	<u>47</u>	<u>48</u>	<u>0</u>	<u>4</u>	<u>2</u>	<u>60</u>	<u>51</u>	<u>50</u>



National Transportation
Agency of Canada

Office national des
transports du Canada

Rail Safety
Branch

Direction générale de
la sécurité ferroviaire

Railway/Pipeline
Investigations
Directorate

Direction des enquêtes
sur les chemins de fer
et les productoducs

**1987 SUMMARY
OF RAILWAY
ACCIDENTS / INCIDENTS
AS REPORTED TO THE
NATIONAL TRANSPORTATION AGENCY
OF CANADA**

Canada



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INTRODUCTION

INTRODUCTION

The Railway Safety Branch of the National Transportation Agency of Canada (NTA) is responsible for both railway safety regulation and accident investigation. Railways under federal jurisdiction in Canada are required to notify the NTA of any unexpected occurrences involving trains, engines, railway cars or on-track equipment, that affect or could affect the safety of rail operations. The investigation of these accidents/incidents is the responsibility of the Railway/Pipeline Investigations Directorate (RPID). Complimentary to the investigation activity is the collection and processing of data pertaining to the frequency, severity, location and cause of accidents. The analysis of this data, which in itself is an investigation function, results in an identification of trends and anomalies which provide a means to develop a better understanding of changes in risks to the public and to railway employees posed by railway operations. Such analyses, based on the findings of a great number of individual accident investigations can, from time to time, lead to recommendations for remedial regulatory action that could not otherwise be made. The RPID also has a further commitment to report upon these statistical examinations to the public, industry, concerned safety agencies and public officials, in the form of recurring reports and in response to specific ad hoc requests.

This document presents a summation of facts and figures pertaining to the various types of accidents/incidents that are annually reported to the NTA. For the purposes of this report, railway occurrences have been classified into three broad categories: Train Accidents, Train Service Accidents and Incidents. Train Accidents include collisions, derailments and accidents at highway/railway crossings. Train Service Accidents include cases where employees or trespassers are struck by rolling stock or where personnel are injured in the process of entraining and detraining. Incidents include fires, dangerous goods leakages, obstructions to main track and miscellaneous personal injuries sustained by railway passengers and employees.

The main intent of this document is to inform interested users of the Canadian railway accident statistical record for the most recent calendar year (1987). The primary emphasis is on data for 1987 and how it compares with figures for the previous year. Each Section examines a particular accident category, the associated accidents/incidents and related casualties. The data is also presented according to various types of collations (eg by railway, province, etc). For those interested in time-series comparisons, data back to 1980 has been provided. With the increased public attention being focussed on major railway accidents, particularly train collisions and derailments, the last Section of the report attempts to identify the nature of the more serious accidents.

The report examines the high profile accident categories - train collisions, train derailments and highway/railway crossing accidents - in relatively more detail than other types of occurrences. As a rule, collisions and derailments are most costly in terms of physical damage to property, and crossing accidents are most critical in terms of human casualty. The frequency of these three categories of accidents taken together has steadily declined since 1980, particularly in more recent years. The downward decline is more dramatic when compared to the trend in railway traffic over the same period.

The success or failure of a safety program can be measured through an examination of associated statistics. The data and analyses in this report indicate that Canadian railway safety, in general, has improved over the past decade. The improvement in safety is to the credit of the Canadian railways, their employees, to the regulatory authorities and in the case of crossing accidents, to the motoring public and to Operation Lifesaver.

A totally safe rail system, however, is one on which there are no accidents, fatalities or injuries. It is obvious that railways, like any other industrial activity can never be made accident free. Some amount of risk is inevitable, and the task before the railways and the NTA, is to ensure that all is done to minimize this risk. For its part, the RPID will continue to initiate rigorous investigations that may yield new recommendations designed to further improve railway safety in Canada. To this end, accident statistics, and analyses will continue to provide an alert to changes in railway safety.

It is hoped that this report assists in developing a better understanding of Canadian railway accident statistics, and results in a productive application of the data to railway safety planning and analysis. As the RPID is constantly attempting to improve its product, reader comments are encouraged.



G.M. McLaughlin
Director
Railway/Pipeline Investigations Directorate
Rail Safety Branch
National Transportation Agency

CONCLUSIONS

CONCLUSIONS

The conclusions summarized below are made with the two-fold intent - firstly to highlight the fact that areas considered to have been critical with respect to railway safety in the past have shown significant improvements over the years, owing in large part to the efforts of all concerned parties; secondly that there are still areas which are of concern, and which the regulator and the railway companies must concentrate upon in order to further reduce the risk associated with railway operations in Canada.

1. The frequency of train accidents has steadily declined since 1980, particularly during the last two years. This decline is more dramatic when normalized with railway traffic. The greatest safety improvements have been associated with crossing accidents, with 1986 and 1987 totals recording successive all time lows. While greater conscientiousness in reporting occurrences involving D.G. cars has likely resulted in an increase in the number of collisions / derailments in yards, spurs and sidings, the accidents on the main track have declined significantly.
2. CN absolute totals for accidents are annually greater than those for CP; however, CN also moves more traffic. Normalizing the accident frequency for each railway shows that CP has a better safety performance in respect of main track collisions and derailments per million train-miles than CN. CN's normalized frequency for crossing accidents, however, is lower than CP's. Both of Canada's major railways show significant improvements in their accident rates over the decade.
3. Most train collisions occur in yards, spurs and sidings during switching operations at low speeds. The causes of collisions are usually operations related, and the rules most often violated involve cars being left foul of movements on adjacent tracks, and insufficient brake applications. Speed infractions, which accounted for a significant portion of cases in 1985-86, declined by nearly half in 1987. In the last two years, however, there has been an increase in the number of collisions due to equipment related causes.
4. Approximately half of all train derailments occur on the main track. Nearly 40% of total derailments are the result of defects in the track itself. Track related cases are evenly split between those that occur on the main track and "other" cases (yards, spurs, sidings). Operations related derailments account for 27% of total cases but most of these are "other" cases. Equipment related derailments account for an additional 14% and these occur mostly on the main track. There has been a decline in equipment related derailments in recent years and this can be attributed to the ongoing conversion of cars equipped with friction bearings to roller bearings, gateway inspections, special speed restrictions and various other risk reducing measures as a result of government regulatory orders.
5. The total number of train collisions / derailments has averaged 348 per annum over the last five years. Of this total one-sixth have been classified as "serious" by the RPID. By their nature, such accidents pose a greater risk to the public and it follows that efforts to further improve railway safety should begin by identifying any negative trends associated

with such cases. The statistics show that non-operational factors play a major role in "serious" accidents. Of the 8 "serious" collisions in 1987, two were equipment related, and of the 42 "serious" derailments, half were caused by track defects. Data on "serious" occurrences also show that 6 collisions and 34 derailments occurred on CN trackage: the 2 equipment related collisions were reported by CN, and CN's track related derailments increased from 10 in 1986 to 19 in 1987. In contrast to the above, one "serious" collision and 7 "serious" derailments occurred on CP track in 1987.

6. Crossing accidents are the most serious type of accidents in terms of human casualty. Although they normally account for the largest number of fatalities in any one year, the persons killed are mostly motor vehicle occupants. Furthermore, less than half of all crossing accidents actually result in a casualty: over the last 5 years, 9% have resulted in a fatality, while an additional 34% resulted in injury. The data with respect to crossing accidents and type of protection indicate that motor vehicle driver error is a factor in a significant portion of crossing accidents. The figures with respect to accidents occurring at locations equipped with gates in particular, show that even the best protection (short of a bridge or tunnel) is sometimes ignored or circumvented.
7. Trespasser fatalities also account for a significant number of railway related fatalities. Many of these are attempted suicides or individuals determined to enter railway property and it is difficult to take preventative measures in such cases.
8. In total, railway related fatalities have declined significantly over the years with 1986 and 1987 figures reaching all time lows. Casualty figures can increase significantly if a passenger train is involved in a major derailment/collision. Over the past five years, an annual average of 3 collisions and 4 derailments involved passenger trains (passenger trains were also involved in 12% of all crossing accidents). However, apart from the 1986 Hinton collision, the number of fatalities caused by train collisions and derailments has averaged between 2 and 3 per annum since 1980.
9. The volume of dangerous goods traffic has increased over the decade and this is reflected in the increase in D.G. related train accidents. However, the vast majority of these cases involve cars that do not result in leaks. Most train collisions / derailments involving D.G. cars are minor occurrences that occur at low speeds in yards, spurs and sidings. The risk of D.G. involvement in a crossing accident is usually less.

To summarize, the 1987 accident statistical record indicates an improvement in Canadian railway safety over the past year. This is a continuation of the downward trend in accident numbers over the decade. Although an accident free environment is next to impossible, the operator and the administrator must nevertheless strive to improve safety even further. Accident frequency numbers such as those presented in this report provide individuals/agencies involved in safety with an effective means by which to measure relative safety performance. To this end, the RPID will continue to release ongoing updates of railway accident statistics.

SECTION 1 Summary of Railway Occurrences

SECTION 1

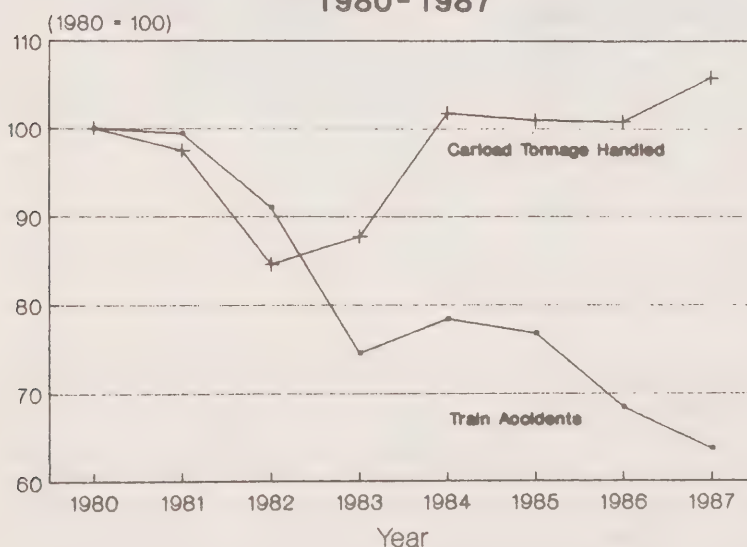
SUMMARY OF RAILWAY OCCURRENCES

Railway Occurrence Frequency

A. Train Accidents

The frequency of train accidents, which include collisions, derailments and crossing accidents, has steadily declined since 1980, particularly during the last two years. Train accidents were at an all time low in 1986 and 1987. A total of 824 train accidents were reported to the NTA in 1987, which is a 7% decline from the 1986 figure. Rail traffic, as measured in carload tonnage handled, increased by 5% over the same time period. Considering work performed therefore, there has been even a greater improvement in railway safety (Fig. 1.1).

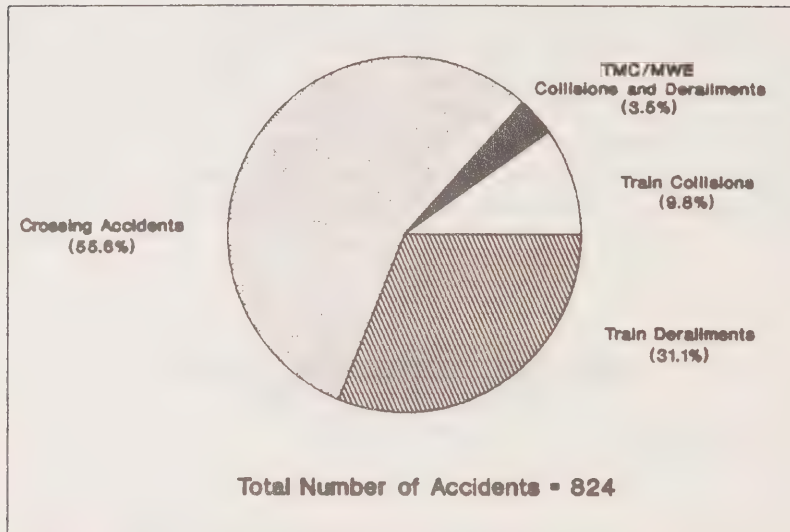
Figure 1.1 TRAIN ACCIDENTS AND CARLOAD TONNAGE HANDLED 1980-1987



It can be seen from Fig. 1.2 that accidents that occur at public, private and farm railway grade crossings account for the largest portion of train accidents (56% in 1987). This category of accidents is the most serious in terms of loss to human life. The decline in all types of train accidents in 1987 is mainly attributable to the sharp decrease in crossing accidents over the year. In fact, the greatest railway safety improvements over the last decade have been associated with crossing accidents. In both 1986 and 1987, crossing accident frequency was successively at all time lows with 525 and 458 accidents respectively.

Figure 1.2

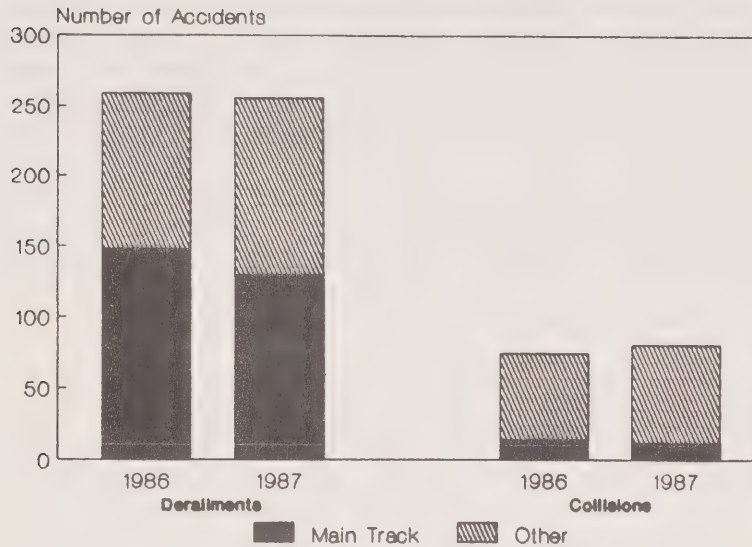
TRAIN ACCIDENTS BY TYPE 1987



Train derailments account for the next largest share of train accidents (31% in 1987), followed by train collisions (10%). Derailments are the most serious category of train accidents in terms of financial loss. Multi-car derailments also have the potential to be disastrous if significant spillage of dangerous goods (D.G.) is involved. However, both derailments and collisions are most critical if passenger trains are involved. Fortunately occurrences such as the 1979 derailment at Mississauga, Ontario and the 1986 collision at Hinton, Alberta are very rare.

The majority of all train collisions and approximately half of all train derailments are not major occurrences, and take place on trackage other than the main track where speeds are usually low (Fig. 1.3). They occur in yards, spurs, sidings or private industry trackage during the course of switching/humping operations and are reportable only if they involve a casualty or loaded/empty cars carrying dangerous goods. Most of these collisions are minor sideswipes, while such derailments involve the derailment of only one or two cars.

**Figure 1.3 TRAIN DERAILMENTS AND COLLISIONS
1986 AND 1987**



Main track derailments and collisions are additionally reportable if damage costs to railway property and equipment exceed a certain threshold. This amount was increased from \$750 to \$7,000 on November 1, 1987 (See Appendix). A total of 256 train derailments were reported to the NTA in 1987. However, this total includes 12 derailments reported during the first 10 months of 1987 which involved property damage under \$7,000 (i.e. accidents reported according to the old criteria). If the \$750 threshold had been in effect during the months of November and December, it is estimated that this would at most raise the 1987 figure to 259 which is still comparable to the 1986 total. This works out to 244 derailments in 1987 reportable under the new criteria plus an additional 15 cases with property damage below \$750. In any examination of accident trends therefore, the RPID recognizes that future annual derailments totals will have to be inflated by some 6 percent (15/244) to allow for accidents reportable under the old criteria. (There were no main track collisions with property damage below \$7,000 reported to the NTA during the first 10 months of 1987).

For a number of reasons, there appears to have been a more complete reporting of accidents in recent years. For example, between 1980 and 1987 the railways were not required to report main track accidents with property damage below \$750. With the general inflation in the economy over this period, more minor accidents would have fallen below the \$750 cut-off in 1980 than in 1987. Also, dangerous goods traffic on the railways has been increasing, and reporting of even the very minor accidents involving such traffic is apparently more comprehensive than in earlier years due to the increased awareness of the risks involved. This completeness in reporting applies in particular to dangerous goods derailments and collisions which do not involve leakages and which comprise the overwhelming majority of accidents involving dangerous goods. Moreover, the number of accidents involving "empty" dangerous goods cars apparently are also being reported more comprehensively than in the past.

Rail traffic in Canada is predominantly freight oriented and consequently most train accidents involve freight trains. Over the past five years, passenger trains were involved in 12% of all crossing accidents. During this same period, an annual average of 3 train collisions and 4 train derailments also involved passenger trains.

Train accidents are classified as dangerous goods (D.G.) related when they directly involve D.G. cars (loaded or empty). The vast majority of these cases do not result in leaks. In 1987, four-fifths of all reportable train collisions involved D.G. cars; however, nearly all of these were minor and occurred in yards, spurs and sidings during switching operations. Approximately two-thirds of all train derailments were D.G. related and of these three-fourths occurred in yards, spurs or sidings. D.G. involvement in crossing accidents is considerably less; in 1987 a little over 3% of all crossing accidents were D.G. related.

The remaining accidents in the Train Accident category are collisions and derailments involving on-track equipment such as track motor cars and maintenance of way machines. These totalled 29 in 1987, a slight increase over the 1986 figure.

B. Train Service Accidents

There were 493 train service accidents in 1987, a considerable increase over the 1986 total of 415. Although these include employees/passengers/trespassers being struck by rolling stock, the vast majority of these accidents involve railway employees being injured while getting off/on rolling stock. They account for the large increase in the annual totals in the train service accidents category.

C. Incidents

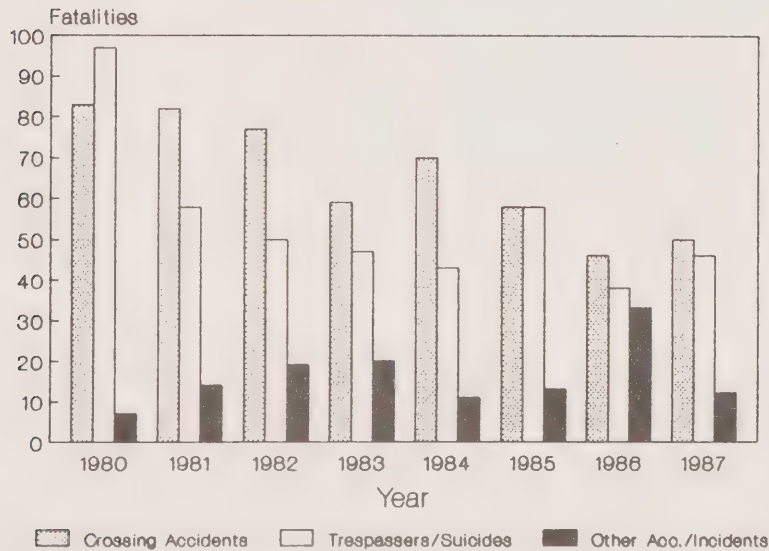
There were 3,209 railway incidents in 1987, which is a decrease of 5.0% from the 1986 figure. These cover a wide variety of occurrences ranging from fires and D.G. leakages (not related to train accidents), to personal injuries incurred by railway employees and train passengers. These personal injuries accounted for nearly four-fifths of all incidents, while miscellaneous D.G. leakages occurrences accounted for an additional 14%.

Casualties

A. Fatalities

Railway related fatalities decreased from 118 in 1986 to 108 in 1987 both of which are successive all time lows. It should be borne in mind that the 1986 figure includes 23 fatalities as a result of the Hinton train collision. Crossing accidents accounted for 46% of total fatalities. Although crossing accidents have always accounted for a major portion of railway fatalities (Fig. 1.4), the persons killed are usually not railway employees or train passengers. Almost all fatalities at railway crossings are motor vehicle occupants. Trespassers (many of whom are apparently intent on suicide) accounted for 49% of all railway fatalities and it can be argued that the railways cannot take meaningful preventative action in respect of most of these accidents. The number of fatalities caused by train collisions and derailments prior to 1986 has not been large, averaging between two and three per annum. In 1987, these two categories of accidents did not result in any fatalities.

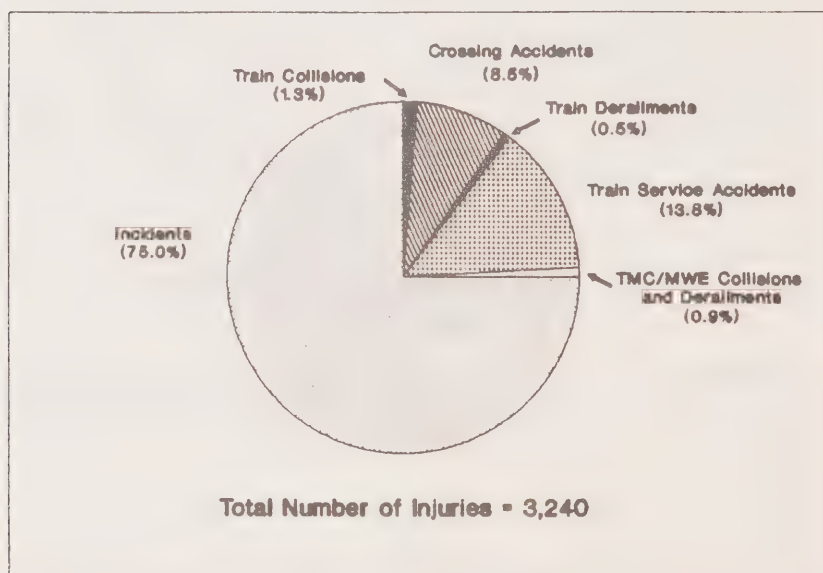
**Figure 1.4 FATALITIES BY TYPE OF ACCIDENT
1980-1987**



B. Injuries

The total number of injuries in 1987 declined by 8.7% from the 1986 total. Incidents accounted for three-fourths of the 3,240 injuries to passengers, employees and others during the year (Fig. 1.5). As stated in the Appendix, there is no minimum severity for reporting injuries: they can range from a loss of limb to a minor cut/bruise from a slip or fall. Train service accidents and accidents at railway crossings, respectively accounted for 14% and 9% of total injuries. Casualty totals for train derailments and collisions fluctuate from year to year, depending upon whether passenger trains are involved. For example, the high collision injury total in 1986 was due to the accidents at Hinton, Alberta and Trudel, Quebec. In 1987, train collisions and derailments resulted in 2% of all railway related injuries.

Figure 1.5 INJURIES BY TYPE OF ACCIDENT
1987



Nearly four-fifths of all injuries in 1987 were to railway employees; train passengers accounted for another 12%. Motor vehicle occupants accounted for most of the remaining injuries.

Serious Accidents

The total number of train collisions and derailments has averaged 348 per annum over the past five years. This may appear to be a large figure since it averages out to nearly an accident a day. However, many of the derailments reported to the NTA are of a minor nature involving the derailment of only one or two cars at low speed, and the majority of the collisions are minor, low speed sideswipes that do not occur on the mainline. Separating out the more

serious cases from the above 348 total, RPID has classified an average of 61 derailments and collisions per year as being "serious". Just over 80% of the above serious accidents were those involving property damage in excess of \$100,000; but half of these property damage accidents were under \$250,000. The remaining cases (21%) were classified as serious due to the severity of D.G./casualty involvement.

Crossing accidents are more critical in terms of human casualty than they are in terms of railway damage costs or D.G. involvement. To place such accidents into perspective, it is pointed out that 9% resulted in a fatality. Although an additional 34% resulted in injury, this percentage includes non-serious injuries. Substantial railway damage costs in a crossing accident may be involved if an ensuing derailment occurs; however, such cases amounted to 2.3% of the total crossing accidents during the years 1983-87. Over the same period only 1.7% of all crossing accidents were D.G. related.

Accident Investigations

Most of the accidents discussed above are investigated by RPID staff. There are, however, different levels of investigation depending upon the severity or nature of the accident and the availability of human and financial resources to the RPID. A Public Hearing is the highest level available. The next highest level is through Section 226 of the Railway Act - a formal inquiry which empowers NTA staff to call witnesses, perform on-site simulation tests and consult with engineering/operations experts. Other investigations include: informal on-site reviews; railway accident file audits; statistical analyses and special studies. Table A in the Appendix presents a list of railway accidents subject to public or formal 226 Investigation over the 1983-1987 period.

In total, the RPID has investigated approximately 830 accidents/incidents per year during the above time period. The RPID's statistics staff process documentation on 4,500 accidents/incidents annually. Approximately 2,500 of these are railway employees getting injured while entraining/detraining rolling stock or are miscellaneous injuries sustained by railway employees not related to train operations. Some 400 cases are D.G. leakages not related to train movement. The railways are also required to notify the RPID on a monthly basis of all hot box occurrences (wheel bearings which are overheated): these amount to approximately 1,000 cases annually.

Safety Performance Rates & Comparisons

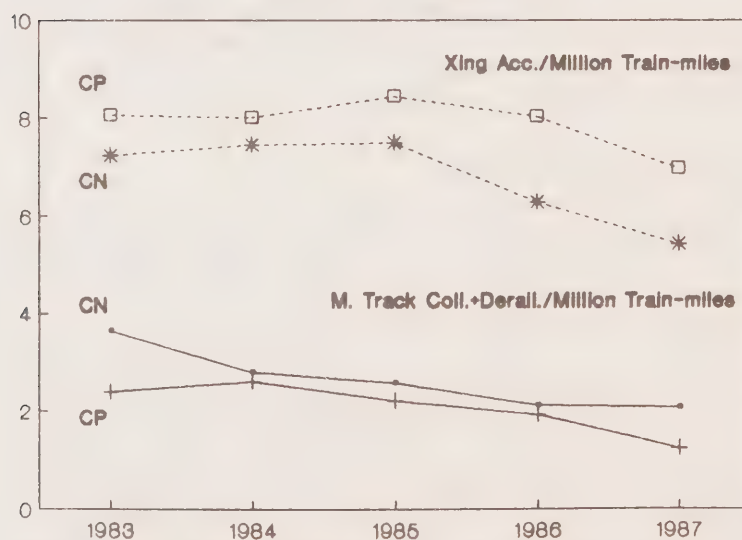
In order to compare accident statistics over time, and thereby evaluate railway safety performance, the number of accidents for any year should be divided by the applicable operating data for that year. This is because the more trains there are and the more freight moved, the greater is the chance of an accident. For example, derailments and collisions can be normalized according to performance indicators such as train-miles or gross ton-miles and crossing accidents can be normalized according to train-miles, number of crossings or number of motor vehicle registrations. The normalized data gives a more accurate indication of the safety performance of railways over time relative to the work carried out. Sections 2,3 and 4 indicate that the ratios of accidents to work performed for train collisions, train derailments and crossing accidents have declined over the years, with 1987 rates resulting in

all time lows: the figures imply a significant improvement in railway safety performance as a result of railway company, railway employee and government safety regulatory actions. Insofar as the RPID makes safety improvement recommendations for regulatory action, RPID has and will continue to be a player in the reduction of railway accidents.

In terms of inter-railway comparisons, CN accident totals are annually greater than those for CP. However, CN handles more traffic per year than CP, and also has more railway crossings. Fig. 1.6 illustrates the CN and CP accident rates between the years 1983-87 for the high profile accident categories. Accidents are shown per million train-miles of work performed in order to get a more accurate comparison of their relative safety performance.

The graph (Fig. 1.6) presents the trends in crossing accident frequency and the frequency of main traffic collisions and derailments taken together. Main track accidents are examined since they pose a far greater risk to the public and to the environment. While CN and CP have both realized marked reductions in the actual accident totals, CP appears to have a greater normalized frequency of crossing accidents than CN (6.98 versus 5.43 accidents per million train-miles in 1987); conversely CN appears to have a greater normalized frequency of main track derailments and collisions than CP (2.09 versus 1.22 accidents per million train-miles in 1987). Data back to 1980 as presented in Sections 2,3 and 4 shows that these accident ratios in recent years are significantly lower than those recorded earlier in the decade, indicating a significant improvement in the safety performance of both of Canada's major railways.

Figure 1.6 ACCIDENTS per MILLION TRAIN-MILES
CN vs CP 1983-1987



NOTE: M. Track Coll.+Derail. exclude cases due to vandalism and non-company error.

TABLE 1.1
NUMBER OF ACCIDENTS AND INCIDENTS
1986 and 1987

	Accidents/Incidents		
	<u>1986</u>	<u>1987</u>	<u>% Change</u>
<u>Train Accidents</u>			
Train Collisions	75	81	8.0
Train Derailments	259	256	-1.2
Crossing Accidents	525	458	-12.8
TMC/MWE Collisions/Derailments*	<u>27</u>	<u>29</u>	7.4
Total Train Accidents	<u>886</u>	<u>824</u>	-7.0
<u>Train Service Accidents</u>			
Employees Struck by Rolling Stock	21	23	9.5
Passengers Struck by Rolling Stock	0	0	-
Trespassers Struck by Rolling Stock	86	92	7.0
Employees Getting Off/On Rolling Stock	<u>308</u>	<u>378</u>	22.7
Total Train Service Accidents	<u>415</u>	<u>493</u>	18.8
<u>Incidents</u>			
Fires	230	301	30.9
Dangerous Goods	398	439	10.3
All Other Incidents	<u>2,749</u>	<u>2,469</u>	-10.2
Total Incidents	<u>3,377</u>	<u>3,209</u>	-5.0

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment

TABLE 1.2
NUMBER OF ACCIDENTS AND INCIDENTS
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Train Accidents</u>								
Train Collisions	97	108	101	92	102	72	75	81
Train Derailments	293	350	327	254	273	278	259	256
Crossing Accidents	826	763	691	567	596	606	525	458
TMC/MWE Collisions/ Derailments*	<u>81</u>	<u>69</u>	<u>61</u>	<u>53</u>	<u>45</u>	<u>39</u>	<u>27</u>	<u>29</u>
Total Train Accidents	<u>1,297</u>	<u>1,290</u>	<u>1,180</u>	<u>966</u>	<u>1,016</u>	<u>995</u>	<u>886</u>	<u>824</u>
<u>Train Service Accidents**</u>	N/A	<u>729</u>	<u>614</u>	<u>702</u>	<u>572</u>	<u>528</u>	<u>415</u>	<u>493</u>
<u>Incidents</u>								
Fires	229	221	273	254	202	226	230	301
Dangerous Goods	107	157	105	288	418	336	398	439
All Other Incidents**	N/A	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,564</u>	<u>2,707</u>	<u>2,749</u>	<u>2,469</u>
Total Incidents		<u>3,264</u>	<u>3,189</u>	<u>2,925</u>	<u>3,184</u>	<u>3,269</u>	<u>3,377</u>	<u>3,209</u>
<u>Dangerous Goods Related Portion of Train Accidents</u>								
Train Collisions	44	65	67	56	66	43	50	63
Train Derailments	65	132	101	94	100	142	144	161
Crossing Accidents	11	4	8	9	10	8	6	14
<u>Carload Traffic Handled (Millions of Metric Tonnes)</u>								
	235.6	229.7	199.4	206.7	239.9	237.9	237.5	249.3

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment

** Beginning with the 1982 Report, the statistical presentation of accident statistics changed. A complete time series is not possible because in earlier years a large portion of the injuries sustained in the Train Service Accidents were included under Miscellaneous Personal Injuries.

TABLE 1.3
CASUALTIES BY ACCIDENT/INCIDENT
1986 and 1987

	Employees		Passengers		Other		Total	
	1986	1987	1986	1987	1986	1987	1986	1987
<u>FATALITIES</u>								
<u>Train Accidents</u>								
Train Collisions	8	0	16	0	0	0	24	0
Train Derailments	0	0	0	0	0	0	0	0
Crossing Accidents	2	0	0	0	45	50	47	50
TMC/MWE Collisions/ Derailments*	0	0	0	0	0	1	0	1
<u>Train Service Accidents</u>	6	7	0	0	38	46	44	53
<u>Incidents</u>								
Fires	0	0	0	0	0	0	0	0
Dangerous Goods	0	0	0	0	0	0	0	0
All Other Incidents	3	0	0	4	0	0	3	4
<u>Total Fatalities</u>	<u>19</u>	<u>7</u>	<u>16</u>	<u>4</u>	<u>83</u>	<u>97</u>	<u>118</u>	<u>108</u>
<u>INJURIES</u>								
<u>Train Accidents</u>								
Train Collisions	70	20	146	20	2	1	218	41
Train Derailments	20	16	1	2	0	0	21	18
Crossing Accidents	22	21	8	12	216	243	246	276
TMC/MWE Collisions/ Derailments*	26	28	0	0	0	1	26	29
<u>Train Service Accidents</u>	322	396	0	0	49	50	371	446
<u>Incidents</u>								
Fires	1	5	0	0	0	14	1	19
Dangerous Goods	16	6	0	0	4	0	20	6
All Other Incidents	2,226	2,056	416	347	3	2	2,645	2,405
<u>Total Injuries</u>	<u>2,703</u>	<u>2,548</u>	<u>571</u>	<u>381</u>	<u>274</u>	<u>311</u>	<u>3,548</u>	<u>3,240</u>

* TMC: Track Motor Car
MWE: Maintenance of Way Equipment

TABLE 1.4
CASUALTIES BY TYPE OF PERSON
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Fatalities</u>								
Passengers	0	1	1	4	0	1	16	4
Employees	10	13	17	16	11	11	19	7
Other	<u>179</u>	<u>140</u>	<u>128</u>	<u>107</u>	<u>113</u>	<u>117</u>	<u>83</u>	<u>97</u>
Total Fatalities	<u>189</u>	<u>154</u>	<u>146</u>	<u>127</u>	<u>124</u>	<u>129</u>	<u>118</u>	<u>108</u>
<u>Injuries</u>								
Passengers	334	636	667	534	429	554	571	381
Employees	3,137	3,189	2,962	2,658	2,720	2,672	2,703	2,548
Other	<u>428</u>	<u>412</u>	<u>337</u>	<u>318</u>	<u>324</u>	<u>320</u>	<u>274</u>	<u>311</u>
Total Injuries	<u>3,899</u>	<u>4,237</u>	<u>3,966</u>	<u>3,510</u>	<u>3,473</u>	<u>3,546</u>	<u>3,548</u>	<u>3,240</u>

SECTION 2 Collisions

SECTION 2

TRAIN COLLISIONS

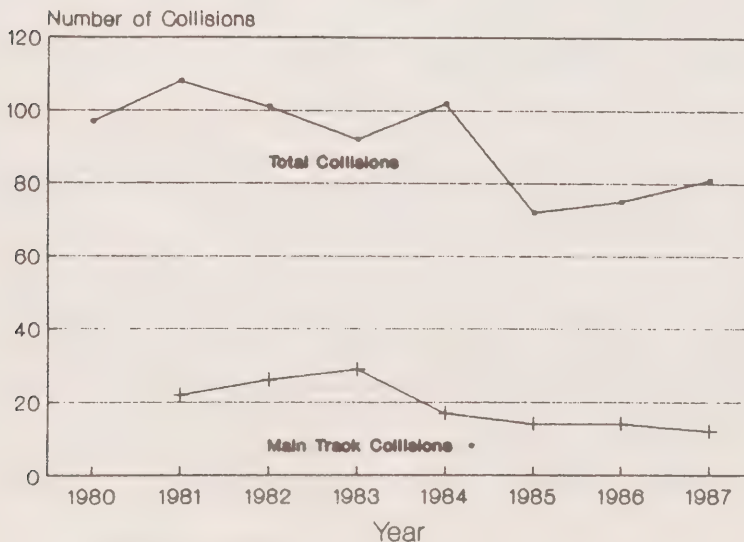
(Collisions Involving Train Movements Only)

Accidents

A train collision is an accident where a moving train, engine or car comes into contact in any way with another train, engine or car. All collisions are reportable to the RPID if they involve dangerous goods cars or casualty; collisions on the main track are also reportable if they result in property damage in excess of the financial reporting threshold (Currently \$7,350 - See Appendix).

There were 81 reportable collisions in 1987; although this is an increase of 6 over the 1986 figure, it is lower than the annual average of 91 over the last eight years. Five-sixths of the 1987 collisions occurred on trackage other than the mainline (Fig. 2.1). The vast majority of these "Other" collisions were minor sideswipes that took place in the course of switching and humping operations in yards, spurs and sidings.

Figure 2.1
**TRAIN COLLISIONS
1980-1987**



There were 12 collisions on the main track in 1987 which is slightly lower than the 1986 figure. Of these 12 cases, three were head-on collisions, 8 were side collisions and one was a rough coupling accident. A total of 28 collisions in 1987 resulted in the derailment of a railway car or engine. In 1986 there were 33 such cases.

Passenger trains were involved in only 3 of the total 81 collisions in 1987, two of which occurred on the main track. In 1986, 5 collisions involved passenger trains and of these 4 occurred on the main track. There has been an annual average of 3 passenger train related collisions over the past five years (See Table 2.9).

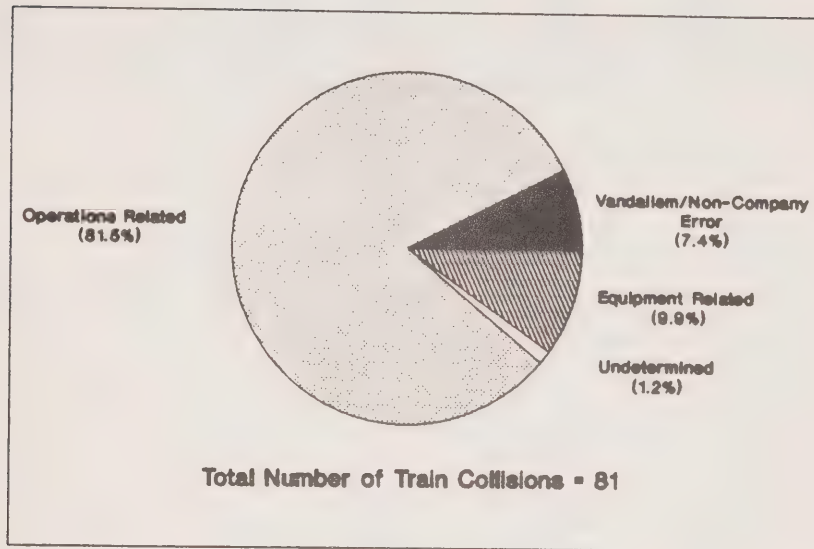
One train collision in 1987 was investigated under Section 226 of the Railway Act. The accident occurred on May 27 at Makinak, Manitoba on the CN Gladstone Subdivision. A CN freight train collided head-on with a work train and resulted in two employee injuries. The cause was attributed to employee error: failure of the train operating crew to properly observe the requirements of applicable operating rules and special instructions.

Four-fifths of all train collisions in 1987 involved cars carrying dangerous goods (D.G.), an increase of 13 such accidents over the previous year. This increase may be due to greater conscientiousness by the railways in the reporting of accidents involving empty cars which last contained a D.G. Practically all of these D.G. related collisions occurred in yards, spurs or sidings during switching operations. D.G. cars involved in collisions may be loaded or empty, but the vast majority of these cases do not result in any loss of product.

The major causes of collisions are related to operational error. Employee violation of operating rules and regulations accounted for four-fifths of all collisions in 1987 (Figure 2.2). An additional 10% were equipment related while the remainder were due to vandalism or non-company error. An examination of rule violations (Table 2.4) indicates that the rules most often violated over the past five years have pertained to brake applications, cars being left foul of movements on adjacent tracks, and speed infractions. The table also indicates a significant decline in 1987 collisions caused by excess speed violations. In contrast to this, collisions due to equipment related causes have increased over the last two years.

The number of main track collisions per million train-miles was 0.15 in 1987, a slight improvement over the figure of 0.18 recorded in 1986. These rates are presented in Table 2.7 which also allows a comparison to be made between CN and CP. CN's normalized frequency in 1987 was 0.18 main track collisions per million train-miles, identical to the figure in 1986. CP's figure of 0.07 in 1987 is significantly lower than that of CN; it is also a significant improvement over the figure of 0.18 recorded in 1986.

Figure 2.2 **TRAIN COLLISIONS BY CAUSE**
1987



Casualties

There were no collision related fatalities in 1987; collisions, however did result in 41 injuries. Eighteen of these injuries were due to one accident in particular: it occurred in November, 1987 on the CN Thicket subdivision near Leven, Manitoba. The accident was a head-on collision between a passenger train and freight train; fortunately the injuries were not major. Although the 1987 casualty totals are considerably lower than the figures recorded in 1986 it should be noted that the 1986 totals include the accidents at Hinton and Trudel which together accounted for 23 fatalities and 168 injuries.

TABLE 2.1
NUMBER OF COLLISIONS BY REPORTING RAILWAY
1986 and 1987

	All Collisions			Dangerous Goods Related Collisions		
	1986	1987	% Change	1986	1987	%Change
<u>CN</u>						
Main Track	9	9		2	0	
Other	<u>44</u>	<u>51</u>		<u>33</u>	<u>49</u>	
Total CN	<u>53</u>	<u>60</u>		<u>35</u>	<u>49</u>	
<u>CP</u>						
Main Track	5	2		1	1	
Other	<u>16</u>	<u>17</u>		<u>13</u>	<u>13</u>	
Total CP	<u>21</u>	<u>19</u>		<u>14</u>	<u>14</u>	
<u>Other Railways</u>						
Main Track	0	1		0	0	
Other	<u>1</u>	<u>1</u>		<u>1</u>	<u>0</u>	
Total Other Railways	<u>1</u>	<u>2</u>		<u>1</u>	<u>0</u>	
<u>All Railways</u>						
Main Track	14	12	-14.3	3	1	-66.7
Other	<u>61</u>	<u>69</u>	13.1	<u>47</u>	<u>62</u>	31.9
Total Collisions	<u>75</u>	<u>81</u>	8.0	<u>50</u>	<u>63</u>	26.0

TABLE 2.2
COLLISION CASUALTIES BY REPORTING RAILWAY
1986 and 1987

	Employees*		Passengers		Total	
	<u>1986</u>	<u>1987</u>	<u>1986</u>	<u>1987</u>	<u>1986</u>	<u>1987</u>
<u>Fatalities</u>						
CN	7	0	16	0	23	0
CP	1	0	0	0	1	0
Other Railways	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>8</u>	<u>0</u>	<u>16</u>	<u>0</u>	<u>24</u>	<u>0</u>
<u>Injuries</u>						
CN	58	14	146	4	204	18
CP	14	4	0	0	14	4
Other Railways	<u>0</u>	<u>3</u>	<u>0</u>	<u>16</u>	<u>0</u>	<u>19</u>
Total Injuries	<u>72</u>	<u>21</u>	<u>146</u>	<u>20</u>	<u>218</u>	<u>41</u>

* 1986 CN injuries include 2 industrial employees
1987 CN injuries include 1 industrial employee

TABLE 2.3
COLLISIONS BY CAUSE AND REPORTING RAILWAY
1986 and 1987

	Main Track			Other Movements			Total		
	1986	1987	% Change	1986	1987	% Change	1986	1987	% Change
<u>CN</u>									
Operations Related	8	7		37	41		45	48	
Equipment Related	0	1		4	4		4	5	
Track Related	0	0		0	0		0	0	
Vandalism/Non-									
Company Error	1	1		2	5		3	6	
Undetermined	<u>0</u>	<u>0</u>		<u>1</u>	<u>1</u>		<u>1</u>	<u>1</u>	
Total CN	<u>9</u>	<u>9</u>		<u>44</u>	<u>51</u>		<u>53</u>	<u>60</u>	
<u>CP</u>									
Operations Related	4	1		13	15		17	16	
Equipment Related	1	1		1	2		2	3	
Track Related	0	0		1	0		1	0	
Vandalism/Non-									
Company Error	0	0		0	0		0	0	
Undetermined	<u>0</u>	<u>0</u>		<u>1</u>	<u>0</u>		<u>1</u>	<u>0</u>	
Total CP	<u>5</u>	<u>2</u>		<u>16</u>	<u>17</u>		<u>21</u>	<u>19</u>	
<u>Other Railways</u>									
Operations Related	0	1		1	1		1	2	
Equipment Related	0	0		0	0		0	0	
Track Related	0	0		0	0		0	0	
Vandalism/Non-									
Company Error	0	0		0	0		0	0	
Undetermined	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	
Total Other Railways	<u>0</u>	<u>1</u>		<u>1</u>	<u>1</u>		<u>1</u>	<u>2</u>	
<u>All Railways</u>									
Operations Related	12	9	-25.0	51	57	11.8	63	66	4
Equipment Related	1	2	100.0	5	6	20.0	6	8	33
Track Related	0	0	-	1	0	-100.0	1	0	-100
Vandalism/Non-									
Company Error	1	1	0.0	2	5	150.0	3	6	100
Undetermined	<u>0</u>	<u>0</u>	-	<u>2</u>	<u>1</u>	-50.0	<u>2</u>	<u>1</u>	-50
Total Collisions	<u>14</u>	<u>12</u>	-14.3	<u>61</u>	<u>69</u>	13.1	<u>75</u>	<u>81</u>	8

TABLE 2.4
COLLISIONS BY DETAILED CAUSE
1983 - 1987

Assessed Cause	1983	1984	1985	1986	1987
1. Crew communication deficiency	15	9	9	6	9
2. Improper handling of switches or derails	11	9	6	8	11
3. Insufficient or improper brake applications	26	25	18	16	20
4. Improper positioning of car or movement	14	17	13	15	13
5. Excess speed	15	22	19	15	8
6. Other employee failure	<u>5</u>	<u>4</u>	<u>1</u>	<u>3</u>	<u>5</u>
Total operations related causes (1-6)	86	86	66	63	66
7. Track related causes	0	0	1	1	0
8. Equipment related causes	3	4	2	6	8
9. Vandalism/Non-Company Error	3	5	2	3	6
10. Undetermined	<u>0</u>	<u>7</u>	<u>1</u>	<u>2</u>	<u>1</u>
Total Collisions	<u><u>92</u></u>	<u><u>102</u></u>	<u><u>72</u></u>	<u><u>75</u></u>	<u><u>81</u></u>

TABLE 2.5
NUMBER OF COLLISIONS BY REPORTING RAILWAY
1980 - 1987

	1980*	1981	1982	1983	1984	1985	1986	1987
<u>CN</u>								
Main Track		13	15	18	14	9	9	9
Other		<u>56</u>	<u>44</u>	<u>43</u>	<u>65</u>	<u>35</u>	<u>44</u>	<u>51</u>
Total CN	<u>47</u>	<u>69</u>	<u>59</u>	<u>61</u>	<u>79</u>	<u>44</u>	<u>53</u>	<u>60</u>
<u>CP</u>								
Main Track		8	9	9	3	4	5	2
Other		<u>28</u>	<u>29</u>	<u>18</u>	<u>20</u>	<u>23</u>	<u>16</u>	<u>17</u>
Total CP	<u>44</u>	<u>36</u>	<u>38</u>	<u>27</u>	<u>23</u>	<u>27</u>	<u>21</u>	<u>19</u>
<u>Other Railways</u>								
Main Track		2	2	2	0	1	0	1
Other		<u>1</u>	<u>2</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
Total Other Railways	<u>6</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>2</u>
<u>All Railways</u>								
Main Track		22	26	29	17	14	14	12
Other		<u>86</u>	<u>75</u>	<u>63</u>	<u>85</u>	<u>58</u>	<u>61</u>	<u>69</u>
Total Collisions	<u>97</u>	<u>108</u>	<u>101</u>	<u>92</u>	<u>102</u>	<u>72</u>	<u>75</u>	<u>81</u>

* Separate figures are not available for 1980 main track collisions

TABLE 2.6
COLLISION CASUALTIES BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Fatalities</u>								
CN	0	3	0	2	0	0	23	0
CP	1	0	0	5	0	0	1	0
Other Railways	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u><u>1</u></u>	<u><u>3</u></u>	<u><u>0</u></u>	<u><u>7</u></u>	<u><u>0</u></u>	<u><u>0</u></u>	<u><u>24</u></u>	<u><u>0</u></u>
<u>Injuries</u>								
CN	31	47	127	95	60	29	204	18
CP	21	19	16	34	13	17	14	4
Other Railways	<u>9</u>	<u>1</u>	<u>4</u>	<u>34</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>19</u>
Total Injuries	<u><u>61</u></u>	<u><u>67</u></u>	<u><u>147</u></u>	<u><u>163</u></u>	<u><u>73</u></u>	<u><u>48</u></u>	<u><u>218</u></u>	<u><u>41</u></u>

TABLE 2.7
MAIN TRACK TRAIN COLLISIONS* PER MILLION TRAIN-MILES (MTM) BY REPORTING RAILWAY
1980 - 1987**

	1980	1981	1982	1983	1984	1985	1986	1987
<u>CN</u>								
Main Track Collisions***		13	15	18	10	8	8	8
MTM	50.5	48.6	41.0	42.9	46.3	45.0	44.8	44.6
Collisions Per MTM		0.27	0.37	0.42	0.22	0.18	0.18	0.18
<u>CP</u>								
Main Track Collisions***		8	8	9	3	3	5	2
MTM	29.6	29.7	26.4	26.8	28.2	27.5	27.4	28.8
Collisions Per MTM		0.27	0.30	0.34	0.11	0.11	0.18	0.07
<u>Other Railways</u>								
Main Track Collisions***		2	2	2	0	1	0	0
MTM	9.2	7.6	6.5	6.3	6.8	6.7	6.8	6.7**
Collisions Per MTM		0.26	0.31	0.32	0.00	0.15	0.00	0.00
<u>All Railways</u>								
Main Track Collisions***		22	26	29	17	14	14	12
MTM	89.2	85.8	73.9	76.0	81.3	79.1	79.0	80.1**
Collisions Per MTM		0.26	0.35	0.38	0.21	0.18	0.18	0.15

- * Main track collisions for CN, CP and Other Railways in this table exclude case due to vandalism and non-company error. Total main track collisions for All Railways, however, include such cases.
- ** VIA train-miles are included in CN and CP
- *** Separate figures are not available for 1980 main track collisions
- **** Estimated

The above train-mile figures exclude yard train-miles.

TABLE 2.8
COLLISIONS AND CASUALTIES BY PROVINCE
1986 and 1987

	1986			1987		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	0	0	0	0	0	0
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	1	0	1	0	0	0
New Brunswick	2	0	4	1	0	0
Quebec	15	0	108	15	0	1
Ontario	26	1	17	25	0	3
Manitoba	6	0	4	7	0	24
Saskatchewan	3	0	1	4	0	1
Alberta	15	23	82	16	0	10
British Columbia	7	0	1	13	0	2
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>75</u>	<u>24</u>	<u>218</u>	<u>81</u>	<u>0</u>	<u>41</u>

TABLE 2.9
COLLISION INVOLVING PASSENGER TRAINS
BY REPORTING RAILWAY
1983 - 1987

	1983	1984	1985	1986	1987
<u>CN</u>					
Main Track	2	1	0	4	1
Other	<u>0</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>0</u>
Total CN	<u><u>2</u></u>	<u><u>3</u></u>	<u><u>1</u></u>	<u><u>5</u></u>	<u><u>1</u></u>
<u>CP</u>					
Main Track	1	0	0	0	0
Other	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total CP	<u><u>1</u></u>	<u><u>0</u></u>	<u><u>1</u></u>	<u><u>0</u></u>	<u><u>0</u></u>
<u>Other Railways</u>					
Main Track	0	0	0	0	1
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total Other Railways	<u><u>0</u></u>	<u><u>0</u></u>	<u><u>0</u></u>	<u><u>0</u></u>	<u><u>2</u></u>
<u>All Railways</u>					
Main Track	3	1	0	4	2
Other	<u>0</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>
Total All Railways	<u><u>3</u></u>	<u><u>3</u></u>	<u><u>2</u></u>	<u><u>5</u></u>	<u><u>3</u></u>

SECTION 3 Derailments

SECTION 3

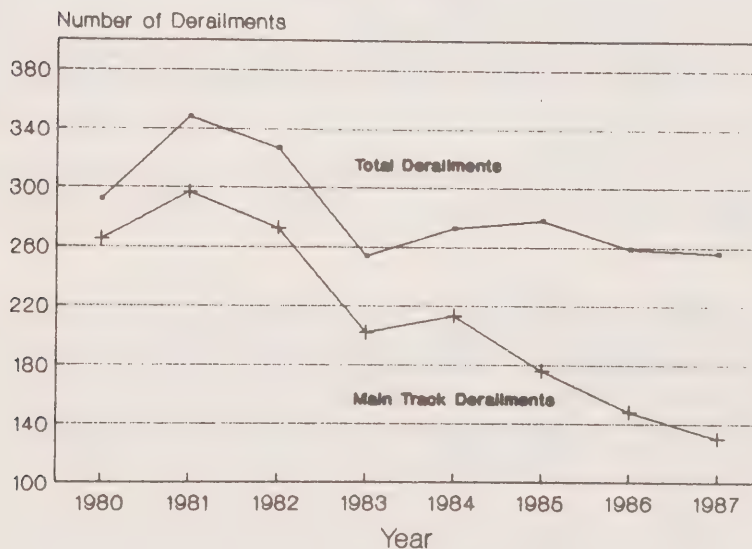
TRAIN DERAILMENTS

(Derailments Involving Train Movements Only)

Accidents

A train derailment is an accident where any moving train, engine or car is derailed. Reporting criteria are the same as for collisions: derailments are reportable if they occur on main track with railway property damage above the financial threshold (currently \$7,350) or any track if involving dangerous goods traffic or casualty. However, unlike collisions, a substantial portion of reportable derailments involve trains operating over main track (See Fig. 3.1).

Figure 3.1 **TRAIN DERAILMENTS**
1980-1987



A total of 256 derailments were reported to the RPID in 1987. However, the damage threshold for the reporting of main track accidents was increased from \$750 to \$7,000 on November 1, 1987, and adjustments to the statistics should raise the 1987 figure to 259, in order to be comparable to the 1986 data which incidently was also 259.

Approximately half of all 1987 derailments occurred on the main track. This is a substantial decline of 12.2% from the 1986 figure. "Other" (non-main track) derailments increased from 111 to 126. As explained in Section 2, the rise can be explained at least partly by the increased conscientiousness in the reporting of derailments involving empty cars which last contained a dangerous good (D.G.).

Of the total 256 derailments in 1987, three cases involved passenger trains and occurred on the main track. These figures are similar to the 1986 totals where passenger trains were also involved in 3 of the total 259 derailments. Over the past five years, there has been an average of 4 passenger train related derailments per annum (See Table 3.10).

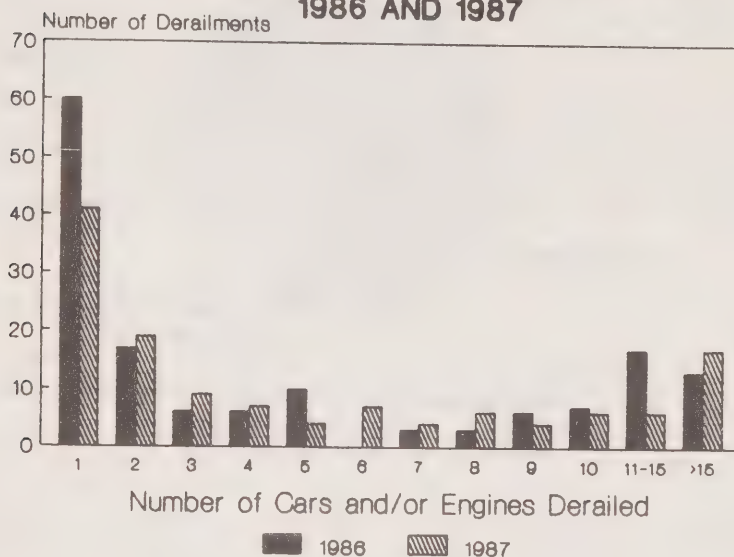
Nearly two-thirds of all derailments in 1987 involved D.G. cars, an increase of 16 such accidents over the total in 1986. Three-fourths of the D.G. related derailments occurred in yards, spurs or sidings. D.G. related derailments on the main track remained unchanged from the previous year while "Other" accidents increased by 14.8%. As is the case with train collisions, most D.G. cars (loaded or empty) involved in a derailment do not result in any loss of product.

Three derailments in 1987 were investigated under Section 226 of the Railway Act:

- (a) On March 9, 1987, 31 cars of a freight train derailed on the CN Nepisiguit subdivision at Nepisiguit, N.B. The cause was attributed to employee error.
- (b) Also on March 9, 1987, 38 cars of a freight train derailed on the CN Springhill subdivision at Thomson, N.S. The cause was determined to be track related.
- (c) On July 14, 1987, two engines and 31 cars of a freight train derailed on the CP Belleville subdivision in the City of North York, Ont. The cause was deduced to be "lateral forces developed by buff forces in the train exerted on diesel units in the locomotive consist resulting in the North rail turning over". A contributing factor was that the last five engines in the consist were not equipped with a coupler alignment control.

The breakdown of main track derailments by number of cars and/or engines derailed is illustrated in Fig. 3.2. Half of all derailments on the main track resulted in the derailment of only one or two cars/engines. Single and two car/engine derailments also accounted for three-fourths of "Other" cases (Table 3.8). In 1987, those accidents that resulted in the derailment of over 10 cars accounted for 9% of all train derailments (in 1986, the comparative figure was 12%).

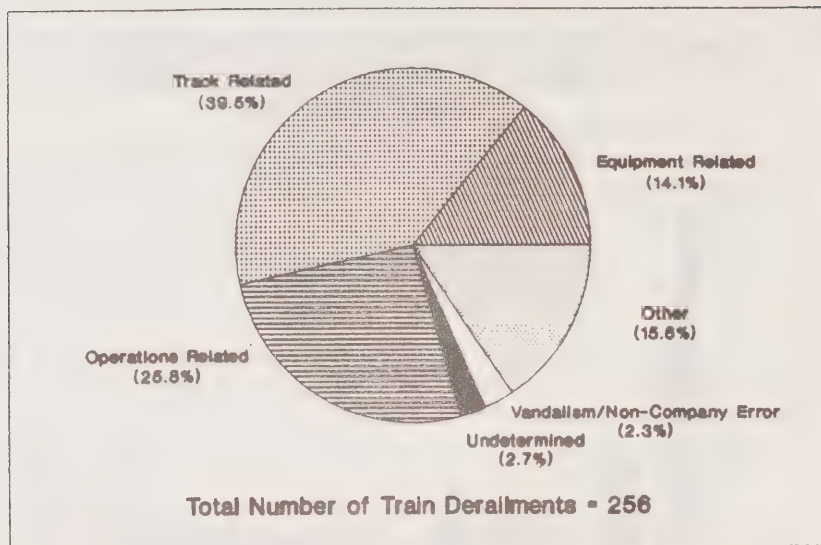
**Figure 3.2 MAIN TRACK DERAILMENTS BY
NUMBER OF CARS/ENGINES DERAILED
1986 AND 1987**



In 1987, 39% of all derailments were track related, 14% equipment related, 26% operations related and the balance attributable to miscellaneous causes (Fig. 3.3). Of the track related derailments, the vast majority were due to component failures in the track itself with gauge restraint, inadequate track geometry, turnout component defects and broken rails and joints being the major causes. The rest were the result of climatological related factors such as snow/ice on the track, slides and washouts. One-third of the equipment related derailments were caused by journal failures with broken wheels, being the next most prominent cause. Rule violations and other employee failure accounted for most of the operations related derailments. The miscellaneous category includes loading defects, vandalism or non-company error, and cases of wheel lift or mounting of the rail with no significant track, equipment or operations related defect identifiable. The causes of derailments are considerably different between main track and "Other" cases. Almost all equipment failures occurred on the main track in 1987. On the other hand, operational causes were more prevalent in respect of "Other" derailments. Track related causes accounted for approximately 40% of the cases - for both main track and "Other" accidents (Table 3.3).

Figure 3.3

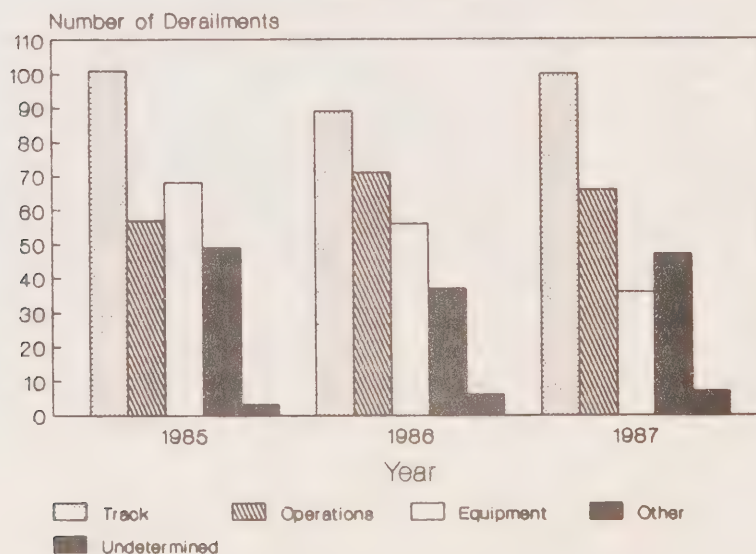
TRAIN DERAILMENTS BY CAUSE 1987



The pattern of derailments by cause for 1983-87 is illustrated in Fig. 3.4. The number of track related cases has remained fairly constant over the period shown, while derailments due to equipment defects have steadily declined. The decline can be attributed in part to the railway's ongoing conversion of cars equipped with friction bearings to roller bearings, gateway inspections and speed reductions of special dangerous goods trains in populated areas, and other risk reducing requirements as a result of regulatory order. The miscellaneous category has fluctuated due to the variability in vandalism and combination (track/equipment/operational) cases.

Figure 3.4

TRAIN DERAILMENTS BY CAUSE 1985-1987



Main track derailments have been normalized according to billions of Freight Gross Ton-miles (BGTM) and also according to millions of Train-miles (MTM), in Table 3.7. The number of main track derailments per BGTM was 0.39 in 1987 down significantly from 0.48 in 1986. The normalized frequency for CN was 0.48 in 1987, slightly lower than the figure of 0.51 in 1986. CP's normalized rates are significantly lower than those for CN: an improvement from 0.40 in 1986 to 0.24 in 1987.

Main track derailments per MTM dropped from 1.87 in 1986 to 1.62 in 1987. The rates for both CN and CP have steadily declined over the years with CP's rates being consistently lower. In 1987, CP's figure for main track derailments per MTM was 1.15, significantly lower than CN's normalized figure of 1.91.

Casualties

Derailments as a rule are not serious in terms of casualties. Since 1980, train derailments have accounted for a total of 2 fatalities; there were none in 1987 or 1986. Derailments, however, did result in 18 injuries in 1987, a slight improvement over the figure of 21 in 1986. Concern is still high with respect to main track derailments due to the potential for severe public risk as a result of dangerous commodity release post-derailments at high speed.

TABLE 3.1
NUMBER OF DERAILMENTS BY REPORTING RAILWAY
1986 and 1987

	All Derailments			Dangerous Goods Related Derailments		
	1986	1987	% Change	1986	1987	% Change
<u>CN</u>						
Main Track	90	86		22	17	
Other	<u>55</u>	<u>65</u>		<u>53</u>	<u>63</u>	
Total CN	<u>145</u>	<u>151</u>		<u>75</u>	<u>80</u>	
<u>CP</u>						
Main Track	48	34		12	14	
Other	<u>41</u>	<u>42</u>		<u>41</u>	<u>42</u>	
Total CP	<u>89</u>	<u>76</u>		<u>53</u>	<u>56</u>	
<u>Other Railways</u>						
Main Track	10	10		2	5	
Other	<u>15</u>	<u>19</u>		<u>14</u>	<u>19</u>	
Total Other Railways	<u>25</u>	<u>29</u>		<u>16</u>	<u>24</u>	
<u>All Railways</u>						
Main Track	148	130	-12.2	36	36	0.0
Other	<u>111</u>	<u>126</u>	13.5	<u>108</u>	<u>124</u>	14.8
Total Derailments	<u>259</u>	<u>256</u>	-1.2	<u>144</u>	<u>160</u>	11.1

TABLE 3.2
DERAILMENT CASUALTIES BY REPORTING RAILWAY
1986 and 1987

	Employees		Passengers		Total	
	<u>1986</u>	<u>1987</u>	<u>1986</u>	<u>1987</u>	<u>1986</u>	<u>1987</u>
<u>Fatalities</u>						
CN	0	0	0	0	0	0
CP	0	0	0	0	0	0
Other Railways	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Injuries</u>						
CN	11	13	1	2	12	15
CP	7	2	0	0	7	2
Other Railways	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>1</u>
Total Injuries	<u>20</u>	<u>16</u>	<u>1</u>	<u>2</u>	<u>21</u>	<u>18</u>

TABLE 3.3
DERAILMENTS BY CAUSE AND REPORTING RAILWAY
1986 and 1987

	Main Track			Other			Total		
	1986	1987	% Change	1986	1987	% Change	1986	1987	% Change
<u>CN</u>									
Track Related	31	33		17	25		48	58	
Equipment Related	31	20		5	2		36	22	
Operations Related	13	11		22	26		35	37	
Other	11	18		5	7		16	25	
Vandalism/Non-									
Company Error	3	1		4	4		7	5	
Undetermined	<u>1</u>	<u>3</u>		<u>2</u>	<u>1</u>		<u>3</u>	<u>4</u>	
Total CN	<u>90</u>	<u>86</u>		<u>55</u>	<u>65</u>		<u>145</u>	<u>151</u>	
<u>CP</u>									
Track Related	15	12		11	15		26	27	
Equipment Related	17	10		1	3		18	13	
Operations Related	6	2		26	19		32	21	
Other	10	9		1	4		11	13	
Vandalism/Non-									
Company Error	0	1		0	0		0	1	
Undetermined	<u>0</u>	<u>0</u>		<u>2</u>	<u>1</u>		<u>2</u>	<u>1</u>	
Total CP	<u>48</u>	<u>34</u>		<u>41</u>	<u>42</u>		<u>89</u>	<u>76</u>	
<u>Other Railways</u>									
Track Related	4	4		11	12		15	16	
Equipment Related	2	1		0	0		2	1	
Operations Related	1	1		3	7		4	8	
Other	2	2		0	0		2	2	
Vandalism/Non-									
Company Error	0	0		1	0		1	0	
Undetermined	<u>1</u>	<u>2</u>		<u>0</u>	<u>0</u>		<u>1</u>	<u>2</u>	
Total Other Railways	<u>10</u>	<u>10</u>		<u>15</u>	<u>19</u>		<u>25</u>	<u>29</u>	
<u>All Railways</u>									
Track Related	50	49	-2.0	39	52	33.3	89	101	13.5
Equipment Related	50	31	-38.0	6	5	-16.7	56	36	-35.7
Operations Related	20	14	-30.0	51	52	2.0	71	66	-7.0
Other	23	29	26.1	6	11	83.3	29	40	37.9
Vandalism/Non-									
Company Error	3	2	-33.3	5	4	-20.0	8	6	-25.0
Undetermined	<u>2</u>	<u>5</u>	150.0	<u>4</u>	<u>2</u>	-50.0	<u>6</u>	<u>7</u>	16.7
Total Derailments	<u>148</u>	<u>130</u>	-12.2	<u>111</u>	<u>126</u>	13.5	<u>259</u>	<u>256</u>	-1.2

TABLE 3.4
DERAILMENTS BY DETAILED CAUSE
1983 - 1987

Assessed Cause	1983	1984	1985	1986	1987
Snow, ice, mud	8	6	18	8	6
Slides, unstable slopes, subsidence	5	6	6	2	2
Washouts, floods	2	3	3	1	4
Track failure - rail buckle	14	11	6	7	10
Track failure - rail rollover	8	5	3	2	0
Track failure - gage restraint	13	16	4	17	22
Track failure - rail or joint broken	21	22	26	15	11
Track failure - type unidentified	1	1	3	2	6
Track geometry	19	22	20	20	18
Turnout component defect	<u>9</u>	<u>10</u>	<u>12</u>	<u>15</u>	<u>22</u>
Total Track Related	<u>100</u>	<u>102</u>	<u>101</u>	<u>89</u>	<u>101</u>
Loose wheels	1	1	2	1	0
Broken wheels	10	9	11	12	8
Broken axles	10	7	3	5	2
Journal failures - roller bearings	17	22	19	17	10
Journal failures - friction bearings	9	8	7	1	3
Truck component defect	5	4	9	5	6
Brake gear defective or dragging	4	5	10	3	3
Draft gear failure	8	5	3	6	4
Other rolling stock defects	<u>7</u>	<u>4</u>	<u>4</u>	<u>6</u>	<u>0</u>
Total Equipment Related	<u>71</u>	<u>65</u>	<u>68</u>	<u>56</u>	<u>36</u>
Rule violations	25	31	33	42	49
Other employee failure	12	10	15	15	9
Traincontrol or marshalling	<u>10</u>	<u>8</u>	<u>9</u>	<u>14</u>	<u>8</u>
Total Operations Related	<u>47</u>	<u>49</u>	<u>57</u>	<u>71</u>	<u>66</u>
Loading defects	13	12	16	3	6
Vandalism and non-company error	5	18	9	8	6
Combination - (track/equip./operational)	17	24	24	26	34
Undetermined	<u>1</u>	<u>3</u>	<u>3</u>	<u>6</u>	<u>7</u>
Total Miscellaneous Cases	<u>36</u>	<u>57</u>	<u>52</u>	<u>43</u>	<u>53</u>
Total Derailments	<u>254</u>	<u>273</u>	<u>278</u>	<u>259</u>	<u>256</u>

TABLE 3.5
NUMBER OF DERAILMENTS BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>CN</u>								
Main Track	189	203	173	139	128	108	90	86
Other	<u>19</u>	<u>37</u>	<u>22</u>	<u>30</u>	<u>38</u>	<u>51</u>	<u>55</u>	<u>65</u>
Total CN	<u>208</u>	<u>240</u>	<u>195</u>	<u>169</u>	<u>166</u>	<u>159</u>	<u>145</u>	<u>151</u>
<u>CP</u>								
Main Track	72	77	85	55	73	59	48	34
Other	<u>2</u>	<u>15</u>	<u>23</u>	<u>9</u>	<u>13</u>	<u>35</u>	<u>41</u>	<u>42</u>
Total CP	<u>74</u>	<u>92</u>	<u>108</u>	<u>64</u>	<u>86</u>	<u>94</u>	<u>89</u>	<u>76</u>
<u>Other Railways</u>								
Main Track	9	12	12	8	12	9	10	10
Other	<u>2</u>	<u>6</u>	<u>12</u>	<u>13</u>	<u>9</u>	<u>16</u>	<u>15</u>	<u>19</u>
Total Other Railways	<u>11</u>	<u>18</u>	<u>24</u>	<u>21</u>	<u>21</u>	<u>25</u>	<u>25</u>	<u>29</u>
<u>All Railways</u>								
Main Track	270	292	270	202	213	176	148	130
Other	<u>23</u>	<u>58</u>	<u>57</u>	<u>52</u>	<u>60</u>	<u>102</u>	<u>111</u>	<u>126</u>
Total Derailments	<u>293</u>	<u>350</u>	<u>327</u>	<u>254</u>	<u>273</u>	<u>278</u>	<u>259</u>	<u>256</u>

TABLE 3.6
DERAILMENT CASUALTIES BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Fatalities</u>								
CN	0	0	0	0	0	1	0	0
CP	0	0	0	0	1	0	0	0
Other Railways	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>
<u>Injuries</u>								
CN	77	83	46	31	14	12	12	15
CP	25	8	49	4	13	7	7	2
Other Railways	<u>1</u>	<u>1</u>	<u>0</u>	<u>7</u>	<u>0</u>	<u>3</u>	<u>2</u>	<u>1</u>
Total Injuries	<u>103</u>	<u>92</u>	<u>95</u>	<u>42</u>	<u>27</u>	<u>22</u>	<u>21</u>	<u>18</u>

TABLE 3.7
MAIN TRACK TRAIN DERAILMENTS* PER BILLIONS OF FREIGHT GROSS TON-MILES (Frt. BGTM)
AND PER MILLIONS OF TRAIN-MILES (MTM)**
BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>CN</u>								
Main Track Derailments	184	194	161	138	120	108	87	85
Freight BGTM	161.0	159.3	139.6	157.7	174.7	166.4	170.9	178.7
Derailments Per Frt BGTM	1.14	1.22	1.15	0.88	0.69	0.65	0.51	0.48
MTM	50.5	48.6	41.0	42.9	46.3	45.0	44.8	44.6
Derailments per MTM	3.64	3.99	3.93	3.22	2.59	2.40	1.94	1.91
<u>CP</u>								
Main Track Derailments	71	69	80	55	71	58	48	33
Freight BGTM	114.0	119.3	112.8	119.6	127.9	120.9	121.3	136.5
Derailments Per Frt BGTM	0.62	0.58	0.71	0.46	0.56	0.48	0.40	0.24
MTM	29.6	29.7	26.4	26.8	28.2	27.5	27.4	28.8
Derailments per MTM	2.40	2.32	3.03	2.05	2.52	2.11	1.75	1.15
<u>Other Railways</u>								
Main Track Derailments	8	11	11	8	11	7	10	10
Freight BGTM	33.5	30.6	23.1	21.3	18.4	27.4	19.1	19.1**
Derailments Per Frt BGTM	0.24	0.36	0.48	0.38	0.60	0.26	0.52	0.52
MTM	9.2	7.6	6.5	6.3	6.8	6.7	6.8	6.7**
Derailments per MTM	0.87	1.45	1.69	1.27	1.62	1.04	1.47	1.49
<u>All Railways</u>								
Main Track Derailments	270	292	270	202	213	176	148	130
Freight BGTM	308.5	309.2	275.6	298.5	321.0	314.7	311.3	334.3**
Derailments Per Frt BGTM	0.88	0.94	0.98	0.68	0.66	0.56	0.48	0.39
MTM	89.2	85.8	73.9	76.0	81.3	79.1	79.0	80.1**
Derailments per MTM	3.03	3.40	3.65	2.66	2.62	2.23	1.87	1.62

* Main Track derailments for CN, CP and Other Railways in this table exclude cases due to vandalism and non-company error. Total main track derailments for All Railways, however, include such cases.

** VIA train-miles are included in CN and CP

*** Estimated

The above train-mile figures exclude yard train-miles.

TABLE 3.8
DERAILMENTS BY NUMBER OF CARS AND/OR ENGINES DERAILED
1986 and 1987

Number of Cars and/or Engines Derailed	1986 Derailments		1987 Derailments	
	Main Track	Other	Main Track	Other
1	60	57	41	76
2	16	27	19	24
3	7	10	9	9
4	6	6	7	4
5	10	4	4	3
6	0	1	7	3
7	3	4	4	3
8	3	0	6	2
9	6	1	4	1
10	7	1	6	0
10-15	17	0	6	0
Over 15	<u>13</u>	<u>0</u>	<u>17</u>	<u>1</u>
Total	<u>148</u>	<u>111</u>	<u>130</u>	<u>126</u>

TABLE 3.9
DERAILMENTS AND CASUALTIES BY PROVINCE
1986 and 1987

	1986			1987		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	4	0	1	5	0	0
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	8	0	0	9	0	0
New Brunswick	10	0	2	5	0	2
Quebec	53	0	0	50	0	0
Ontario	85	0	8	87	0	2
Manitoba	14	0	1	11	0	5
Saskatchewan	13	0	3	12	0	2
Alberta	32	0	0	38	0	3
British Columbia	40	0	6	39	0	4
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>259</u>	<u>0</u>	<u>21</u>	<u>256</u>	<u>0</u>	<u>18</u>

TABLE 3.10
DERAILMENTS INVOLVING PASSENGER TRAINS
BY REPORTING RAILWAY
1983 - 1987

	1983	1984	1985	1986	1987
<u>CN</u>					
Main Track	2	4	0	2	2
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total CN	<u>2</u>	<u>4</u>	<u>0</u>	<u>2</u>	<u>2</u>
<u>CP</u>					
Main Track	1	1	3	1	0
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total CP	<u>1</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>0</u>
<u>Other Railways</u>					
Main Track	2	2	1	0	1
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other Railways	<u>2</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>1</u>
<u>All Railways</u>					
Main Track	5	7	4	3	3
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total All Railways	<u>5</u>	<u>7</u>	<u>4</u>	<u>3</u>	<u>3</u>

SECTION 4 Crossing Accidents

SECTION 4

CROSSING ACCIDENTS

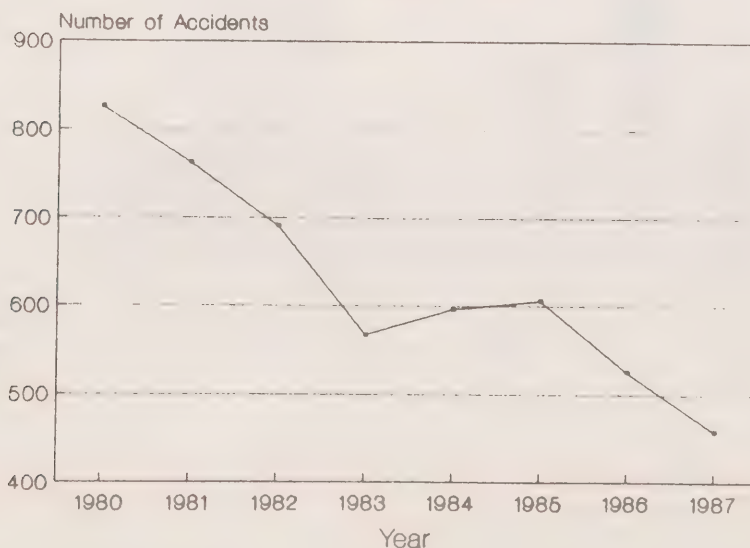
Accidents

A railway grade crossing accident is one where any unit of rolling stock on the rails strikes or is struck by a user of a public, private or farm crossing, and damage or injury results. All accidents at public crossings are reportable to the RPID, private or farm crossing accidents being reportable only if they involve a casualty/dangerous goods (D.G.)/property damage in excess of the financial threshold for mainline operations.

Crossing accidents do not, as a rule, result in substantial damage to railway property or equipment; usually the motor vehicle is heavily damaged or destroyed. However, the fact that: a) there is over one crossing accident per day; b) this type of accident directly involves the public (the road user); and c) there is one fatality for every 10 crossing accidents, makes such accidents the most high profile category of railway accidents.

The greatest railway safety improvements over the past decade have been associated with crossing accidents. Crossing accidents have continued to decline since 1980, with the figures for 1986 and 1987 being successive all time lows (Fig. 4.1). A total of 458 crossing accidents were reported to the NTA in 1987, which is a significant 12.8% reduction from the 525 accidents in 1986. The decline in recent years can partly be explained by increased recognition of the risks associated with drinking and driving, continuing engineering improvements and ongoing driver awareness programs. Since private and farm crossings are only reportable if they involve a casualty/D.G., the majority of reportable crossing accidents are those at public (highway) crossings. For example, there were 421 such public crossing accidents in 1987 as compared to a total of 497 in 1986.

**Figure 4.1 NUMBER OF CROSSING ACCIDENTS
1980-1987**



Public crossings are protected with either automated (e.g. gates, flashing lights and bells) or passive (e.g. reflectorized crossbuck signs) warning devices to caution the motor vehicle driver of the approaching railway hazard. Crossings equipped with passive warnings outnumber those with automated devices by a margin of over two to one. However, crossings with automated devices are usually located at crossings where the train and vehicle traffic is relatively high and therefore these crossings have greater train and vehicular accident risk. Consequently over the years, and in 1987, the number of accidents at crossings with automated devices have slightly outnumbered accidents at crossings with passive warning devices (Fig. 4.2).

**Figure 4.2 ACCIDENTS AT PUBLIC CROSSINGS AND
NUMBER OF PUBLIC CROSSINGS (100) BY PROTECTION
1985-1987**

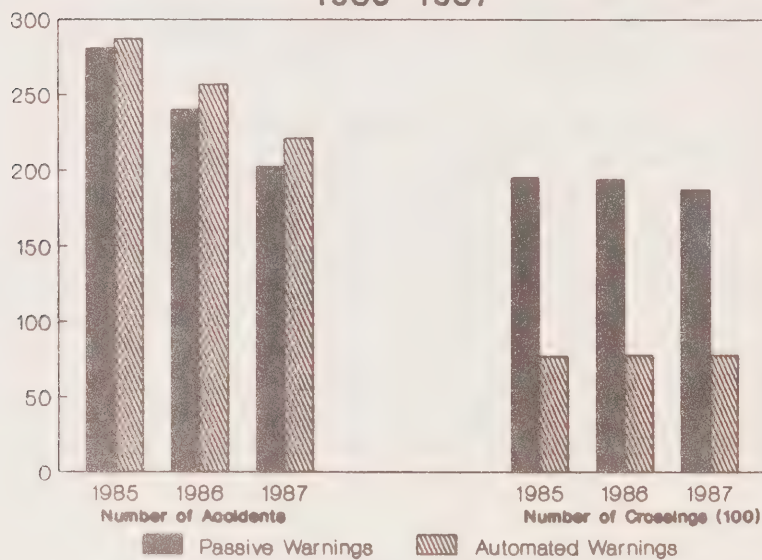
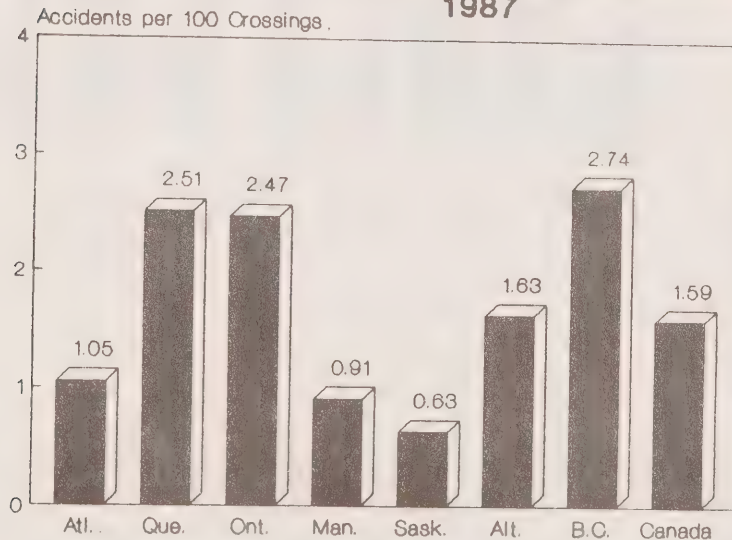


Table 4.4 is a breakdown of crossing accidents by protection type for the years 1986 and 1987. An examination of public crossings equipped with automated warning devices shows that one-fourth of all public crossings are equipped with flashing lights and bells, while an additional 4 percent are protected with gates. The table also shows that over the last two years, 43 percent of all public crossing accidents occurred at crossings equipped with flashing lights and bells; an additional 8 percent occurred at crossings equipped with gates.

Although the absolute number of accidents at crossings with automated warnings have decreased over the two years, the figures nevertheless indicate that a significant portion of accidents are caused by motor vehicle driver error. Authorities may take preventative measures by upgrading protection types but the figures, particularly those with respect to gates, indicate that little can be done to deter the impatient or careless driver.

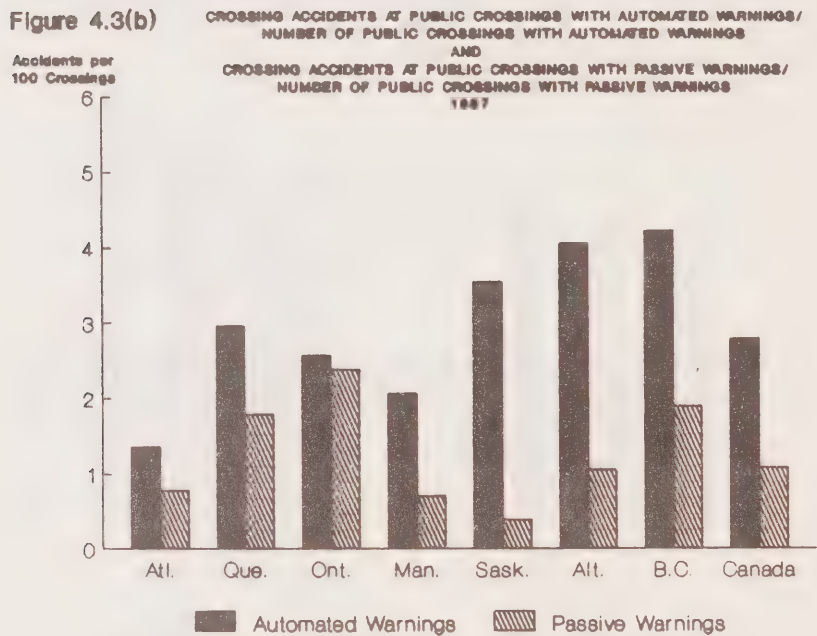
The provinces of Ontario and Quebec together accounted for 54% of all public crossing accidents in 1987. These two provinces also accounted for 56% of all Canadian motor vehicle registrations and just over one-third of the some 26,500 public highway/railway crossings in Canada. The number of accidents at public crossings is shown by province in Fig. 4.3(a). There were approximately 1.6 accidents for every 100 crossings in Canada as a whole. Quebec, B.C. and Ontario had values well above the national average. Accident ratios for Manitoba, Saskatchewan and the Atlantic provinces were below the value for Canada. The value for Alberta was similar to that for Canada.

**Figure 4.3(a) TOTAL PUBLIC CROSSING ACCIDENTS/
TOTAL NUMBER OF PUBLIC CROSSINGS
1987**



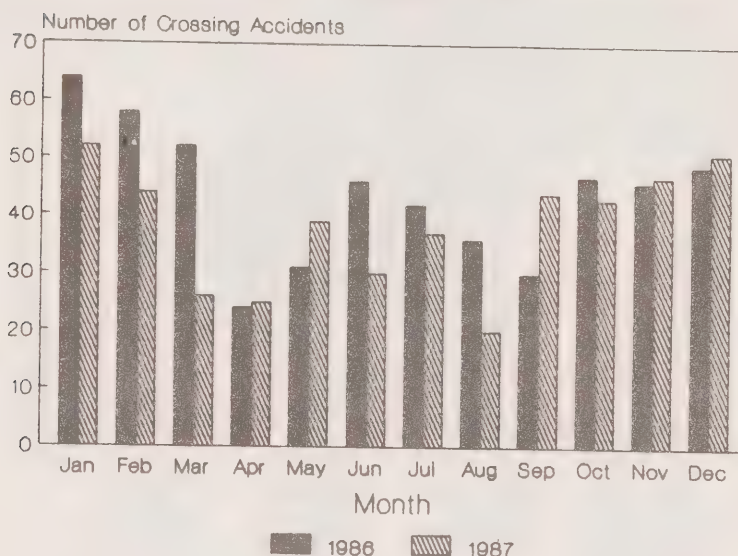
In 1987, crossings equipped with passive warnings accounted for 70% of the total public crossings in Canada. The accident ratios with respect to public crossings equipped with automated and passive warnings are shown in Fig. 4.3(b). The values for Canada were 2.8 and 1.1 accidents respectively for every 100 crossings. However, crossings with passive warnings are not used as frequently as crossings with automated warnings. Looking at the accident ratios for crossings equipped with automated warnings, as a better indicator of relative safety performance, the Atlantic provinces as a whole had the best record in 1987 followed by Manitoba. Ontario's record was superior to the other provinces even though it accounts for the largest number of crossings equipped with automated warnings in Canada.

Figure 4.3(b)



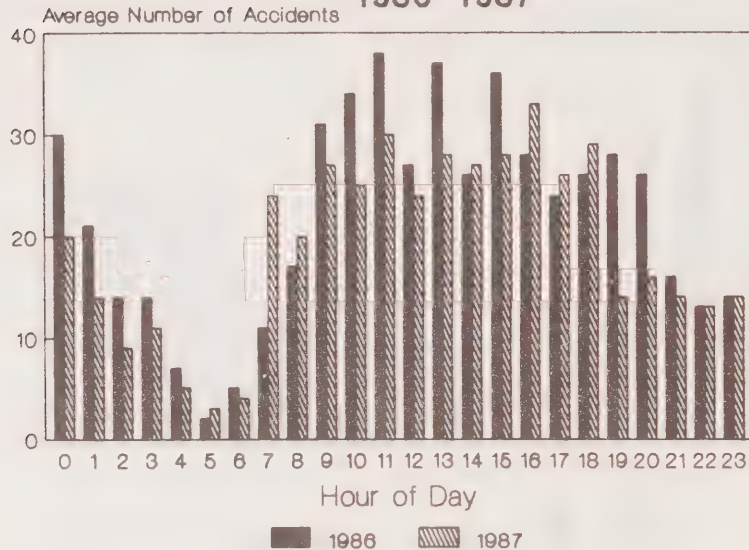
Owing to the unpredictable driving conditions during the winter season, the months of January, February and December are usually the most critical times of the year for crossing accidents: they accounted for one-third of all reported crossing accidents in 1987. Fig. 4.4 illustrates the fluctuation in crossing accidents by month. The minor peaks during certain summer/fall months are presumably due to the increased volume of holiday traffic.

Figure 4.4 TOTAL CROSSING ACCIDENTS BY MONTH
1986-1987



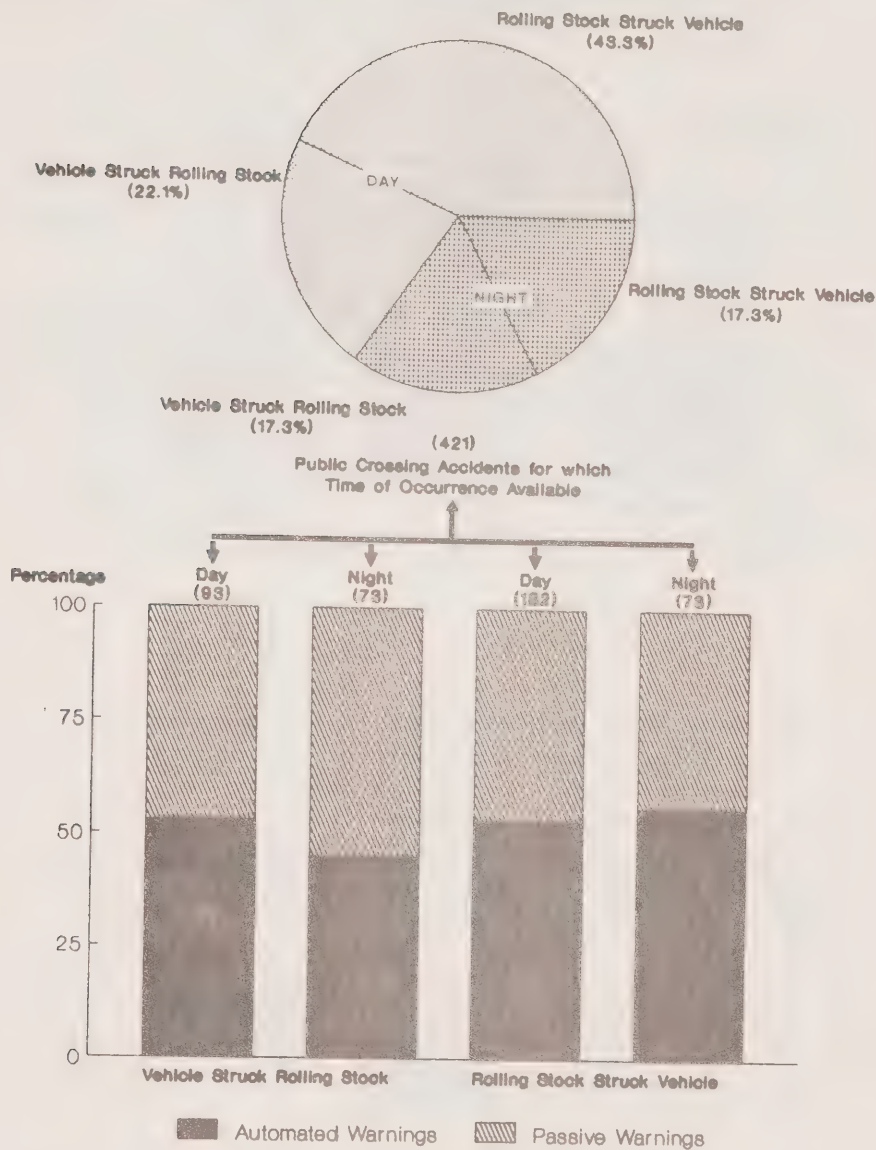
Two out of every three crossing accidents occur during the daytime. Fig. 4.5, which shows the variation in crossing accidents by time of day, indicates a higher probability for an accident occurring during the mid-day hours owing to the large volume of commercial and private motor-vehicle traffic during this time period. Accidents appear to taper off by mid-afternoon after which the 'after-office' rush hour accounts for another very high peak in crossing accidents. The morning rush hour is not as critical since drivers are presumably more alert at this time. Accidents during the late evening hours may be attributable to factors such as fatigue and alcohol consumption by private vehicle drivers. The numbers are fairly constant during these hours and there is a minor peak around midnight/1.00 a.m. at which time late night businesses close; accidents then drastically drop in number until the morning.

Figure 4.5 AVERAGE NUMBER OF CROSSING
ACCIDENTS BY TIME OF DAY
1986-1987



Crossing accidents in which a train strikes the vehicle outnumber those accidents where the vehicle strikes the train by 3 to 2. Part of the explanation lies in the fact that motor vehicle drivers are apt to be impatient and rather than wait for the approaching train, they may be tempted to take chances when a crossing is clear of rolling stock. Fig. 4.6 is a graphical representation of 1987 public crossing accidents by impact type. The figure illustrates the percentage breakdown of impact type by day and night, and then takes the breakdown one step further by subdividing the above accidents into those that occurred at crossings equipped with automated and passive warnings respectively.

Figure 4.6 PUBLIC CROSSING ACCIDENTS BY IMPACT
1987



An examination of crossing accidents by rolling stock indicates that some 83% of the rolling stock involved in crossing accidents in 1987 were freight movements. Passenger trains accounted for another 13% and the rest involved movements of track motor cars and maintenance of way equipment. Table 4.14 shows the number of passenger train related crossing accidents for the last five years. During this period passenger trains were involved in 12% of all crossing accidents. In terms of train-miles performed by all railways, freight movements normally account for four times the volume of passenger traffic. A breakdown of 1987 crossing accidents by type of traffic gives the following: there were 4.1 crossing accidents involving passenger trains per million passenger train-miles; the corresponding figure for accidents involving freight trains per million freight train-miles was 5.9.

The number of crossing accidents per million motor vehicle registrations declined significantly from 35 in 1986 to 29 in 1987. Crossing accidents by vehicle type are presented in Table 4.5. One-fifth of all vehicle registrations are trucks and buses (75% being passenger automobiles) and yet one-third of all crossing accidents involved trucks.

The risk of dangerous goods (D.G.) being involved in a crossing accident is considerably less than that in a collision or derailment. Over the years, D.G. related crossing accidents have always amounted to less than 2% of the total reportable crossing accident totals, although this figure rose to 3.1% in 1987. Crossing accidents also generally do not result in a derailment of rolling stock: there were 12 such cases in 1987 as compared to 10 in 1986.

Table 4.10 shows that crossing accidents per million train-miles (MTM) dropped significantly from 6.65 in 1986 to 5.72 in 1987. Although the absolute number of crossing accidents has declined significantly over the decade, the decline in the normalized accident rate confirms the significant improvements in crossing safety. The table also shows CN and CP performance ratios. Both railways have recorded considerable improvements over the years with CN figures consistently below those for CP. In 1987, CN recorded a figure of 5.43 crossing accidents per MTM - significantly lower than CP's figure of 6.98.

Casualties

It would seem that in most cases, a crossing accident should result in a casualty. In actual fact, less than half of all crossing accidents over the past eight years, have resulted in either a fatality or injury (Fig. 4.7 compares total crossing accidents and those that involved casualties - for the years 1985-87). In 1987, the percentage of casualty crossing accidents increased to 50% (10% of all crossing accidents resulted in at least one fatality while an additional 40% resulted in injury). Since the total number of crossing accidents actually declined in 1987, this means that there were more multi-casualty accidents in 1987 than there were in 1986. A total of 50 fatalities and 276 injuries were caused by crossing accidents in 1987. Although these figures are higher than those recorded in 1986, it should be pointed out that the 1986 totals were all time lows, and that the numbers for 1987 are lower than those recorded during the years 1980-85.

Figure 4.8 illustrates the frequency distribution for crossing fatalities and the accidents causing them for the years 1985-87. For example in 1986, a total of 47 fatalities were caused by 40 accidents: 37 of these accidents were single fatality cases, 1 accident resulted in 2 fatalities, and 2 accidents each of which resulted in 4 fatalities. In 1987 the number of fatality related accidents increased to 46; however, these resulted in only 3 more fatalities than the total in 1986. This is because the breakdown for multi-fatality accidents was different in 1987: 42 of the cases were single fatality occurrences; the remaining 4 accidents each resulted in 2 fatalities.

Figure 4.7 TOTAL CROSSING ACCIDENTS AND CASUALTY CROSSING ACCIDENTS 1985-1987

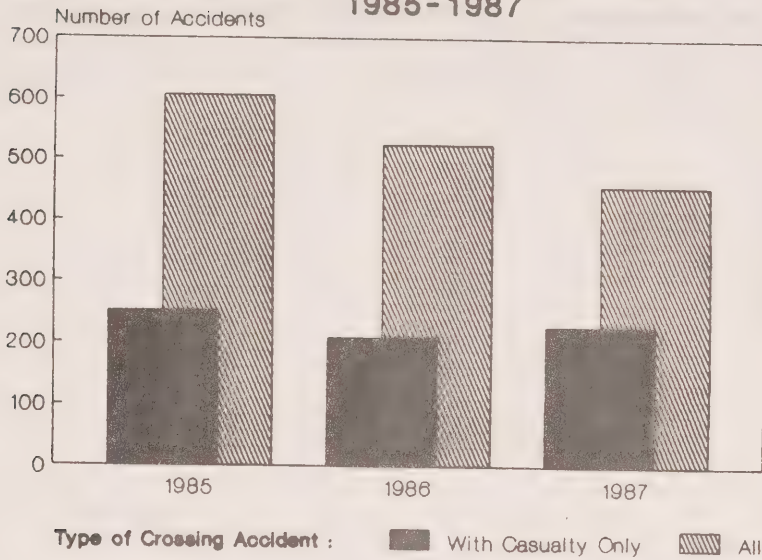
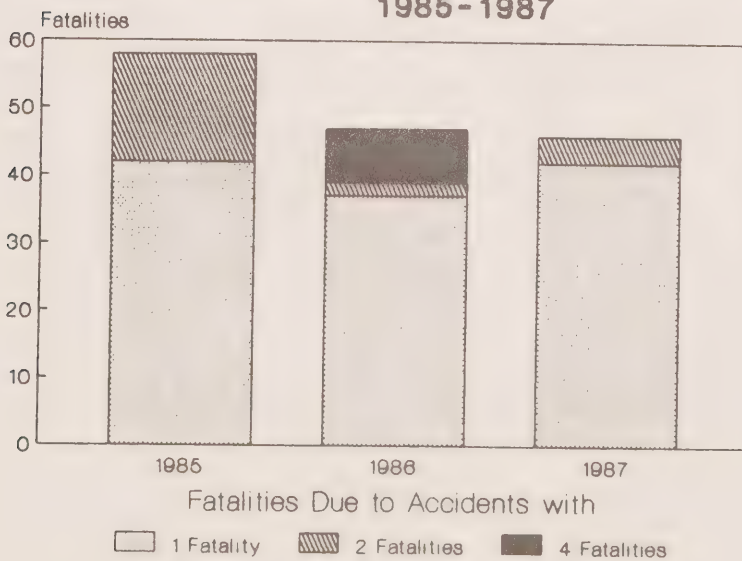


Figure 4.8 FREQUENCY DISTRIBUTION OF FATALITIES AND CROSSING ACCIDENTS CAUSING THEM 1985-1987



Crossing accidents normally account for the largest number of railway associated fatalities in any one year. In 1987, however, they accounted for 46% of total fatalities which is slightly less than the share of trespasser deaths. The majority of those killed are motor vehicle occupants and not railway employees or train passengers. In 1987, motor vehicle occupants accounted for 90% of all crossing fatalities, the remainder being pedestrians. Motor vehicle occupants also accounted for some 86% of total injuries at railway crossings.

TABLE 4.1
CROSSING ACCIDENTS BY REPORTING RAILWAY
1987

	CN	CP	OTHER	ALL RAILWAYS TOTAL	%
<u>Crossing Accidents by Type of Crossing</u>					
Public-Equipped with Automated Warnings	118	95	6	219	48
Public-Equipped with Passive Warnings	102	92	8	202	44
Private	18	11	1	30	6
Farm	<u>4</u>	<u>3</u>	<u>0</u>	<u>7</u>	<u>2</u>
Total Crossing Accidents	<u>242</u>	<u>201</u>	<u>15</u>	<u>458</u>	<u>100</u>
<u>Crossing Accidents by Province</u>					
Newfoundland	4	0	0	4	1
Prince Edward Island	3	0	0	3	1
Nova Scotia	8	1	1	10	2
New Brunswick	4	5	0	9	2
Quebec	60	20	4	84	18
Ontario	83	76	9	168	37
Manitoba	12	18	0	30	7
Saskatchewan	20	23	0	43	9
Alberta	31	34	0	65	14
British Columbia	17	24	1	42	9
Yukon	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Crossing Accidents	<u>242</u>	<u>201</u>	<u>15</u>	<u>458</u>	<u>100</u>
<u>Crossing Accidents by Time of Year</u>					
January, February and December	90	51	6	147	32
March to November	<u>152</u>	<u>150</u>	<u>9</u>	<u>311</u>	<u>68</u>
Total Crossing Accidents	<u>242</u>	<u>201</u>	<u>15</u>	<u>458</u>	<u>100</u>

TABLE 4.1 (CONTINUED)
CROSSING ACCIDENTS BY REPORTING RAILWAY
1987

	CN	CP	OTHER	ALL RAILWAYS TOTAL	%
<u>Crossing Accidents by Time of Day</u>					
Day	160	136	10	306	67
Night	81	65	5	151	33
Unknown	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total Crossing Accidents	<u>242</u>	<u>201</u>	<u>15</u>	<u>458</u>	<u>100</u>
<u>Crossing Accidents by Type of Collision</u>					
Rolling Stock Struck Vehicle	150	131	4	285	62
Vehicle Struck Rolling Stock	<u>92</u>	<u>70</u>	<u>11</u>	<u>173</u>	<u>38</u>
Total Crossing Accidents	<u>242</u>	<u>201</u>	<u>15</u>	<u>458</u>	<u>100</u>
<u>Crossing Accidents by Type of Rolling Stock</u>					
Passenger	37	15	0	52	11
Rail Diesel Car	3	3	0	6	1
Freight	196	170	14	380	83
Plow	1	2	0	3	1
Track Motor Car	2	10	1	13	3
Maintenance of Way Equipment	<u>3</u>	<u>1</u>	<u>0</u>	<u>4</u>	<u>1</u>
Total Crossing Accidents	<u>242</u>	<u>201</u>	<u>15</u>	<u>458</u>	<u>100</u>
<u>Crossing Accidents by Type of Casualty</u>					
Resulting in Injury	97	78	6	181	40
Resulting in Fatality	30	16	0	46	10
Non-Casualty	<u>115</u>	<u>107</u>	<u>9</u>	<u>231</u>	<u>50</u>
Total Crossing Accidents	<u>242</u>	<u>201</u>	<u>15</u>	<u>458</u>	<u>100</u>

TABLE 4.2
NUMBER OF CROSSING ACCIDENTS BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>CN</u>								
Public Crossings	404	399	361	285	322	310	269	220
Private Crossings	21	25	23	24	18	23	13	18
Farm Crossings	<u>3</u>	<u>5</u>	<u>7</u>	<u>1</u>	<u>5</u>	<u>4</u>	<u>0</u>	<u>4</u>
Total CN	<u>428</u>	<u>429</u>	<u>391</u>	<u>310</u>	<u>345</u>	<u>337</u>	<u>282</u>	<u>242</u>
<u>CP</u>								
Public Crossings	303	266	245	211	217	222	207	187
Private Crossings	12	13	7	3	8	7	10	11
Farm Crossings	<u>9</u>	<u>7</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>3</u>	<u>3</u>
Total CP	<u>324</u>	<u>286</u>	<u>253</u>	<u>216</u>	<u>226</u>	<u>232</u>	<u>220</u>	<u>201</u>
<u>Other Railways</u>								
Public Crossings	70	46	44	40	24	36	21	14
Private Crossings	4	2	1	0	1	1	2	1
Farm Crossings	<u>0</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other Railways	<u>74</u>	<u>48</u>	<u>47</u>	<u>41</u>	<u>25</u>	<u>37</u>	<u>23</u>	<u>15</u>
<u>All Railways</u>								
Public Crossings	777	711	650	536	563	568	497	421
Private Crossings	37	40	31	27	27	31	25	30
Farm Crossings	<u>12</u>	<u>12</u>	<u>10</u>	<u>4</u>	<u>6</u>	<u>7</u>	<u>3</u>	<u>7</u>
Total All Railways	<u>826</u>	<u>763</u>	<u>691</u>	<u>567</u>	<u>596</u>	<u>606</u>	<u>525</u>	<u>458</u>

TABLE 4.3
CROSSING ACCIDENT CASUALTIES BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Fatalities</u>								
CN	44	48	43	28	49	37	26	32
CP	34	23	30	30	20	17	19	18
Other Railways	<u>5</u>	<u>11</u>	<u>4</u>	<u>2</u>	<u>1</u>	<u>4</u>	<u>2</u>	<u>0</u>
Total Fatalities	<u>83</u>	<u>82</u>	<u>77</u>	<u>60</u>	<u>70</u>	<u>58</u>	<u>47</u>	<u>50</u>
<u>Injuries</u>								
CN	256	244	195	164	162	171	134	146
CP	141	180	138	96	106	149	101	123
Other Railways	<u>38</u>	<u>27</u>	<u>24</u>	<u>25</u>	<u>21</u>	<u>15</u>	<u>11</u>	<u>7</u>
Total Injuries	<u>435</u>	<u>451</u>	<u>357</u>	<u>285</u>	<u>289</u>	<u>335</u>	<u>246</u>	<u>276</u>

TABLE 4.4
CROSSING ACCIDENTS BY TYPE OF PROTECTION
1986 and 1987

	1986		1987	
	<u>Accidents Crossings</u>		<u>Accidents Crossings</u>	
Public Crossings				
Reflectorized Crossing Signs	240	19,111	202	18,627
Other Passive Warnings	<u>0</u>	<u>289</u>	<u>0</u>	<u>75</u>
Sub-Total	<u>240</u>	<u>19,400</u>	<u>202</u>	<u>18,702</u>
Flashing Lights and Bells	206	6,618	192	6,632
Gates	50	1,133	27	1,194
Other Automated Warnings	<u>1</u>	<u>21</u>	<u>0</u>	<u>21</u>
Sub-Total	<u>257</u>	<u>7,772</u>	<u>219</u>	<u>7,847</u>
Total Public Crossings	497	<u><u>27,172</u></u>	421	<u><u>26,549</u></u>
Private Crossings	25		30	
Farm Crossings	<u>3</u>		<u>7</u>	
Total Crossings	<u><u>525</u></u>		<u><u>458</u></u>	

TABLE 4.5
CROSSING ACCIDENTS BY TYPE OF VEHICLE
1987

	Accidents: Rolling Stock Striking Vehicle		Accidents: Vehicle Striking Rolling Stock		Accidents: All		Motor Vehicle Registrations*
	No.	%	No.	%	No.	%	%
Passenger automobiles	169	60	116	67	287	63	75.4
Trucks and buses	95	33	54	31	149	33	21.1
Motorcycles and bicycles	8	3	3	2	11	2	3.0
Pedestrians and other persons	<u>11</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>11</u>	<u>2</u>	<u>0.5</u>
Total	<u>283</u>	<u>100</u>	<u>173</u>	<u>100</u>	<u>458</u>	<u>100</u>	<u>100.0</u>

* Based on 1986 data.

TABLE 4.6
CROSSING ACCIDENTS BY TYPE OF CROSSING
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Casualty Accidents</u>								
Public Crossings	318	287	240	214	215	213	181	190
Private Crossings	37	40	31	27	27	31	24	30
Farm Crossings	<u>12</u>	<u>12</u>	<u>10</u>	<u>4</u>	<u>6</u>	<u>7</u>	<u>3</u>	<u>7</u>
Sub-total	<u>367</u>	<u>339</u>	<u>281</u>	<u>245</u>	<u>248</u>	<u>251</u>	<u>208</u>	<u>227</u>
<u>Non-Casualty Accidents</u>								
Public Crossings	459	424	410	322	348	355	316	231
Private Crossings	0	0	0	0	0	0	1	0
Farm Crossings	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-total	<u>459</u>	<u>424</u>	<u>410</u>	<u>322</u>	<u>348</u>	<u>355</u>	<u>317</u>	<u>231</u>
<u>All Accidents</u>								
Public Crossings	777	711	650	536	563	568	497	421
Private Crossings	37	40	31	27	27	31	25	30
Farm Crossings	<u>12</u>	<u>12</u>	<u>10</u>	<u>4</u>	<u>6</u>	<u>7</u>	<u>3</u>	<u>7</u>
Total Crossing Accidents	<u>826</u>	<u>763</u>	<u>691</u>	<u>567</u>	<u>596</u>	<u>606</u>	<u>525</u>	<u>458</u>

TABLE 4.7
CROSSING CASUALTIES BY TYPE OF PERSON
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Fatalities</u>								
Motor Vehicle Occupants	70	78	72	56	67	52	41	45
Railway Employees*	1	1	1	0	2	1	2	0
Railway Passengers	0	0	0	0	0	0	0	0
Pedestrians	<u>12</u>	<u>3</u>	<u>4</u>	<u>4</u>	<u>1</u>	<u>5</u>	<u>4</u>	<u>5</u>
Total Fatalities	<u>83</u>	<u>82</u>	<u>77</u>	<u>60</u>	<u>70</u>	<u>58</u>	<u>47</u>	<u>50</u>
<u>Injuries</u>								
Motor Vehicle Occupants	341	355	290	243	255	259	213	237
Railway Employees	40	42	30	30	20	17	22	21
Railway Passengers	45	51	34	5	7	51	8	12
Pedestrians	<u>9</u>	<u>3</u>	<u>3</u>	<u>7</u>	<u>7</u>	<u>8</u>	<u>3</u>	<u>6</u>
Total Injuries	<u>435</u>	<u>451</u>	<u>357</u>	<u>285</u>	<u>289</u>	<u>335</u>	<u>246</u>	<u>276</u>

* 1984 data includes 1 contractor
1986 data includes 1 contractor

TABLE 4.8
CASUALTIES BY TYPE OF CROSSING PROTECTION
1986 and 1987

Type of Crossing	Injuries		Fatalities	
	1986	1987	1986	1987
Public Crossings				
Reflectorized Crossing Signs	115	101	18	15
Other				
Passive Warnings	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-Total	<u>115</u>	<u>101</u>	<u>18</u>	<u>15</u>
Flashing Lights and Bells	88	127	15	24
Gates	9	7	11	2
Other				
Automated Warnings	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-Total	<u>97</u>	<u>134</u>	<u>26</u>	<u>26</u>
Total Public Crossings	212	235	44	41
Private Crossings	31	33	3	7
Farm Crossings	<u>3</u>	<u>8</u>	<u>0</u>	<u>2</u>
Total Crossings	<u>246</u>	<u>276</u>	<u>47</u>	<u>50</u>

TABLE 4.9
CROSSING ACCIDENTS: MISCELLANEOUS RATIOS
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
Total Accidents	826	763	691	567	596	606	525	458
Cases with Derailment	20	13	11	18	12	11	10	12
Percent	2.4	1.7	1.6	3.2	2.0	1.8	1.9	2.6
Cases with Dangerous Goods	11	4	8	9	10	8	6	14
Percent	1.3	0.5	1.2	1.6	1.7	1.3	1.1	3.1
Millions of Motor Vehicle Registrations (MMVR)	13.7	13.9	14.3	14.6	14.4	14.8	15.2	15.6*
Crossing Accidents/MMVR	60	55	48	39	41	41	35	29*

* Estimated

TABLE 4.10
CROSSING ACCIDENT PER MILLIONS OF TRAIN-MILES (MTM)*
BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>CN</u>								
Crossing Accidents	428	429	391	310	345	337	282	242
MTM	50.5	48.6	41.0	42.9	46.3	45.0	44.8	44.6
Crossing Acc. per MTM	8.48	8.83	9.54	7.23	7.45	7.49	6.29	5.43
<u>CP</u>								
Crossing Accidents	324	286	253	216	226	232	220	201
MTM	29.6	29.7	26.4	26.8	28.2	27.5	27.4	28.8
Crossing Acc. per MTM	10.95	9.63	9.58	8.06	8.01	8.44	8.03	6.98
<u>Other Railways</u>								
Crossing Accidents	74	48	47	41	25	37	23	15
MTM	9.2	7.6	6.5	6.3	6.8	6.7	6.8	6.7**
Crossing Acc. per MTM	8.04	6.32	7.23	6.51	3.68	5.52	3.38	2.24
<u>All Railways</u>								
Crossing Accidents	826	763	691	567	596	606	525	458
MTM	89.2	85.8	73.9	76.0	81.3	79.1	79.0	80.1**
Crossing Acc. per MTM	9.26	8.89	9.35	7.46	7.33	7.66	6.65	5.72

* VIA train-miles are included in CN and CP.

** Estimated

TABLE 4.11
CROSSING ACCIDENTS BY PROVINCE
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
Newfoundland	4	3	10	4	2	4	2	4
Prince Edward Island	3	4	5	3	5	3	3	3
Nova Scotia	20	11	14	15	17	17	14	10
New Brunswick	30	16	26	13	16	17	14	9
Quebec	146	140	133	95	122	119	96	84
Ontario	277	277	228	226	195	200	212	168
Manitoba	51	40	44	30	43	38	34	30
Saskatchewan	83	65	74	51	61	68	60	43
Alberta	138	147	104	77	89	84	51	65
British Columbia	73	59	50	53	46	55	39	42
Yukon	0	0	1	0	0	0	0	0
North West Territories	<u>1</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>
Canada	<u>826</u>	<u>763</u>	<u>691</u>	<u>567</u>	<u>596</u>	<u>606</u>	<u>525</u>	<u>458</u>

TABLE 4.12
CROSSING ACCIDENT INJURIES BY PROVINCE
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
Newfoundland	2	3	7	1	0	0	0	4
Prince Edward Island	4	1	4	0	10	1	0	2
Nova Scotia	9	3	8	13	10	13	9	8
New Brunswick	15	3	16	5	10	9	9	6
Quebec	111	103	64	53	63	62	45	41
Ontario	127	135	111	110	92	98	92	116
Manitoba	15	15	18	13	22	21	29	19
Saskatchewan	60	35	37	26	19	28	31	18
Alberta	68	117	71	38	44	65	21	41
British Columbia	24	34	17	26	19	38	10	21
Yukon	0	0	2	0	0	0	0	0
North West Territories	<u>0</u>	<u>2</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>435</u>	<u>451</u>	<u>357</u>	<u>285</u>	<u>289</u>	<u>335</u>	<u>246</u>	<u>276</u>

TABLE 4.13
CROSSING ACCIDENT FATALITIES BY PROVINCE
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
Newfoundland	0	1	0	1	0	2	0	0
Prince Edward Island	0	0	0	0	0	0	0	0
Nova Scotia	1	3	0	1	0	0	0	3
New Brunswick	3	2	5	1	0	2	2	0
Quebec	16	16	19	9	20	19	13	15
Ontario	28	35	31	25	25	18	21	17
Manitoba	3	2	1	4	9	1	0	5
Saskatchewan	10	3	9	6	5	7	6	4
Alberta	20	14	11	8	7	9	4	4
British Columbia	2	6	1	5	4	0	1	2
Yukon	0	0	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>83</u>	<u>82</u>	<u>77</u>	<u>60</u>	<u>70</u>	<u>58</u>	<u>47</u>	<u>50</u>

TABLE 4.14
CROSSING ACCIDENTS INVOLVING PASSENGER TRAINS
BY REPORTING RAILWAY
1983 - 1987

	1983	1984	1985	1986	1987
<u>CN</u>					
Public	30	37	56	38	33
Private	6	3	6	4	4
Farm	<u>1</u>	<u>3</u>	<u>1</u>	<u>0</u>	<u>3</u>
Total CN	<u>37</u>	<u>43</u>	<u>63</u>	<u>42</u>	<u>40</u>
<u>CP</u>					
Public	24	22	23	16	15
Private	0	2	0	0	3
Farm	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total CP	<u>24</u>	<u>25</u>	<u>23</u>	<u>17</u>	<u>18</u>
<u>Other Railways</u>					
Public	2	1	0	0	0
Private	0	0	0	0	0
Farm	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other Railways	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>All Railways</u>					
Public	56	60	79	54	48
Private	6	5	6	4	7
Farm	<u>1</u>	<u>4</u>	<u>1</u>	<u>1</u>	<u>3</u>
Total	<u>63</u>	<u>69</u>	<u>86</u>	<u>59</u>	<u>58</u>

**SECTION 5 Track Motor Car and Maintenance of Way Equipment
Collisions/Derailments**

SECTION 5

TRACK MOTOR CAR AND MAINTENANCE OF WAY EQUIPMENT COLLISIONS/DERAILMENTS

Accidents

This section tabulates collisions/derailments involving on-track work equipment such as track motor cars and maintenance of way equipment.

During 1987, 23 collisions between or involving such equipment were reported to the NTA, a slight increase over the figure of 20 in 1986. Of the 1987 collisions, 9 were reported by CN and 14 by CP. In 1986, both railways reported the same number of on-track equipment related collisions.

There were 6 on-track equipment derailments during the year, which is nearly the same as the total of 7 such accidents in 1986. In both years, the majority of the derailment cases involved track motor cars. Over the decade, the number of on-track equipment derailments occurring on CP trackage has been consistently higher than those on CN track.

Casualties

On track-equipment accidents resulted in one fatality in 1987. An industrial employee was killed while working behind a freight train when it was struck by a track motor car. There were no on-track equipment related fatalities in 1986. Collisions/derailments involving on-track equipment resulted in 29 injuries in 1987, which is a slight increase from the 26 injuries incurred during the previous year.

TABLE 5.1
NUMBER OF COLLISIONS INVOLVING TMC AND MWE* AND
RELATED CASUALTIES** BY REPORTING RAILWAY
1986 and 1987

	Collisions			Casualties			
	1986	1987	% Change	Injured		Killed	
				1986	1987	1986	1987
<u>TMC-TMC, TMC-MWE and MWE-MWE</u>							
CN	1	3		1	8	0	0
CP	4	6		3	8	0	0
Other Railways	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-total	<u>5</u>	<u>9</u>		<u>4</u>	<u>16</u>	<u>0</u>	<u>0</u>
<u>TMC-Train and MWE-Train</u>							
CN	9	6		4	4	0	1
CP	6	8		8	2	0	0
Other Railways	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-total	<u>15</u>	<u>14</u>		<u>12</u>	<u>6</u>	<u>0</u>	<u>1</u>
<u>Total TMC and MWE</u>							
CN	10	9	-10.0	5	12	0	1
CP	10	14	40.0	11	10	0	0
Other Railways	<u>0</u>	<u>0</u>	-	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC and MWE	<u>20</u>	<u>23</u>	15.0	<u>16</u>	<u>22</u>	<u>0</u>	<u>1</u>

* TMC: Track Motor Car

MWE: Maintenance of Way Equipment

** All casualties are employees

TABLE 5.2
TOTAL COLLISIONS INVOLVING TMC AND MWE* AND
RELATED CASUALTIES** BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Collisions</u>								
CN	25	34	30	21	17	16	10	9
CP	16	16	12	14	9	11	10	14
Other Railways	<u>8</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC and MWE related Collisions	<u>49</u>	<u>53</u>	<u>43</u>	<u>36</u>	<u>28</u>	<u>27</u>	<u>20</u>	<u>23</u>
<u>Casualties</u>								
<u>Fatalities</u>								
CN	1	0	4	0	0	1	0	1
CP	1	1	0	0	0	1	0	0
Other Railways	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>2</u>	<u>1</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>0</u>	<u>1</u>
<u>Injuries</u>								
CN	25	65	22	30	24	12	5	12
CP	18	14	8	18	13	23	11	10
Other Railways	<u>17</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Injuries	<u>60</u>	<u>83</u>	<u>30</u>	<u>48</u>	<u>37</u>	<u>35</u>	<u>16</u>	<u>22</u>

* TMC: Track Motor Car

MWE: Maintenance of Way Equipment

** All casualties are employees

TABLE 5.3
NUMBER OF DERAILMENTS INVOLVING TMC AND MWE* AND
RELATED CASUALTIES** BY REPORTING RAILWAY
1986 and 1987

	Derailments			Casualties			
	1986	1987	% Change	Injuries		Fatalities	
				1986	1987	1986	1987
<hr/>							
<u>TMC</u>							
CN	1	2		3	3	0	0
CP	4	3		6	3	0	0
Other Railways	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC	<u>5</u>	<u>5</u>		<u>9</u>	<u>6</u>	<u>0</u>	<u>0</u>
<u>MWE</u>							
CN	1	0		0	0	0	0
CP	1	1		1	1	0	0
Other Railways	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total MWE	<u>2</u>	<u>1</u>		<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>
<u>Total TMC and MWE</u>							
CN	2	2	0.0	3	3	0	0
CP	5	4	-20.0	7	4	0	0
Other Railways	<u>0</u>	<u>0</u>	-	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC and MWE	<u>7</u>	<u>6</u>	-14.3	<u>10</u>	<u>7</u>	<u>0</u>	<u>0</u>

* TMC: Track Motor Car

MWE: Maintenance of Way Equipment

** All casualties are employees

TABLE 5.4
TOTAL DERAILMENTS INVOLVING TMC AND MWE* AND
RELATED CASUALTIES** BY REPORTING RAILWAY
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Derailements</u>								
CN	6	2	4	3	5	3	2	2
CP	25	11	12	14	12	9	5	4
Other Railways	<u>1</u>	<u>3</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total TMC and MWE Derailements	<u>32</u>	<u>16</u>	<u>18</u>	<u>17</u>	<u>17</u>	<u>12</u>	<u>7</u>	<u>6</u>
<u>Casualties</u>								
<u>Fatalities</u>								
CN	0	0	0	0	0	0	0	0
CP	0	0	0	1	0	0	0	0
Other Railways	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Injuries</u>								
CN	8	2	5	6	3	6	3	3
CP	31	12	20	20	17	12	7	4
Other Railways	<u>1</u>	<u>3</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Injuries	<u>40</u>	<u>17</u>	<u>31</u>	<u>26</u>	<u>20</u>	<u>18</u>	<u>10</u>	<u>7</u>

* TMC: Track Motor Car

MWE: Maintenance of Way Equipment

** All casualties are employees

TABLE 5.5
TMC AND MWE* RELATED COLLISIONS AND DERAILMENTS AND
RELATED CASUALTIES** BY PROVINCE
1986 and 1987

	1986			1987		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	0	0	0	0	0	0
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	1	0	1	1	0	1
New Brunswick	0	0	0	1	0	2
Quebec	3	0	1	7	1	5
Ontario	12	0	8	10	0	7
Manitoba	4	0	5	2	0	1
Saskatchewan	0	0	0	2	0	1
Alberta	1	0	3	1	0	2
British Columbia	6	0	8	5	0	10
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>27</u>	<u>0</u>	<u>26</u>	<u>29</u>	<u>1</u>	<u>29</u>

- * TMC: Track Motor Car
MWE: Maintenance of Way Equipment
** All casualties are employees

SECTION 6 Train Service Accidents

SECTION 6

TRAIN SERVICE ACCIDENTS

Accidents

Train Service Accidents as shown in this report, represent persons (including trespassers) sustaining injuries or dying as a result of being struck by rolling stock, or employees injured while in the process of entraining/detraining rolling stock.

In 1987, there were 493 such accidents, which is considerably higher than the figure of 415 in 1986. The large rise is almost entirely due to the cases involving railway employees sustaining injuries getting off/on rolling stock. They account for three-fourths of all Train Service Accidents.

Table 6.4 examines persons being struck by rolling stock - by railway over the last five years. The number of accidents involving employees being struck by rolling stock is not very different for CN and CP when taken over the entire period. However, there has been an annual average of 69 CN trespasser accidents between 1983-87, as opposed to an annual frequency of 56 for CP.

Casualties

Train Service Accidents accounted for 53 fatalities in 1987 which is approximately half of all railway related deaths during the year. This is a significant increase over the 1986 total of 44 fatalities. Most of these fatalities, were trespassers and suicides. Although this relatively large number of deaths should not be ignored, it is difficult to deter a determined trespasser, or an individual intent to end his/her life on railway property. People determined on committing such acts can find ways of overcoming any railway preventative measures.

Train Service Accidents also resulted in 446 injuries in 1987, as compared to 371 in 1986. The majority of these cases are injuries to employees getting off/on rolling stock.

TABLE 6.1
TRAIN SERVICE ACCIDENTS AND CASUALTIES
1986 and 1987

	1986	1987	% Change
<u>Accidents</u>			
Employees struck by Rolling Stock	21	23	9.5
Passengers struck by Rolling Stock	0	0	-
Trespassers struck by Rolling Stock	86	92	7.0
Employees getting off/on Rolling Stock	<u>308</u>	<u>378</u>	22.7
Total Train Service Accidents	<u>415</u>	<u>493</u>	18.8
<u>Casualties</u>			
<u>Fatalities</u>			
Employees struck by Rolling Stock	6	7	16.7
Passengers struck by Rolling Stock	0	0	-
Trespassers struck by Rolling Stock	38	46	21.1
Employees getting off/on Rolling Stock	<u>0</u>	<u>0</u>	-
Total Fatalities	<u>44</u>	<u>53</u>	20.5
<u>Injuries</u>			
Employees struck by Rolling Stock	16	20	25.0
Passengers struck by Rolling Stock	0	0	-
Trespassers struck by Rolling Stock	47	48	2.1
Employees getting off/on Rolling Stock	<u>308</u>	<u>378</u>	22.7
Total Injuries	<u>371</u>	<u>446</u>	20.2

TABLE 6.2
TRAIN SERVICE ACCIDENTS AND CASUALTIES
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Accidents</u>								
Employees struck by Rolling Stock	32	27	29	35	38	25	21	23
Passengers struck by Rolling Stock	N/A	1	0	0	0	2	0	0
Trespassers struck by Rolling Stock	177	109	91	111	101	104	86	92
Employees getting off/on Rolling Stock	N/A	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>	<u>397</u>	<u>308</u>	<u>378</u>
Total Accidents		<u>729</u>	<u>614</u>	<u>703</u>	<u>572</u>	<u>528</u>	<u>415</u>	<u>493</u>
<u>Casualties</u>								
<u>Fatalities</u>								
Employees struck by Rolling Stock	6	3	7	6	8	3	6	7
Passengers struck by Rolling Stock	N/A	1	0	0	0	0	0	0
Trespassers struck by Rolling Stock	97	58	50	47	43	58	38	46
Employees getting off/on Rolling Stock	N/A	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fatalities		<u>62</u>	<u>57</u>	<u>53</u>	<u>51</u>	<u>61</u>	<u>44</u>	<u>53</u>
<u>Injuries</u>								
Employees struck by Rolling Stock	25	24	22	30	32	22	16	20
Passengers struck by Rolling Stock	N/A	0	0	0	0	2	0	0
Trespassers struck by Rolling Stock	80	46	40	65	60	50	47	48
Employees getting off/on Rolling Stock	N/A	<u>592</u>	<u>494</u>	<u>557</u>	<u>433</u>	<u>397</u>	<u>308</u>	<u>378</u>
Total Injuries		<u>662</u>	<u>556</u>	<u>652</u>	<u>525</u>	<u>471</u>	<u>371</u>	<u>446</u>

See Footnote to Table 1.2

TABLE 6.3
TRESPASSERS BY PROVINCE
1986 and 1987

	1986			1987		
	Accidents	Killed	Injured	Accidents	Killed	Injured
Newfoundland	0	0	0	1	1	0
Prince Edward Island	0	0	0	0	0	0
Nova Scotia	2	1	1	1	1	0
New Brunswick	2	1	1	0	0	0
Quebec	16	8	9	10	6	4
Ontario	39	21	16	42	20	22
Manitoba	4	0	4	3	2	1
Saskatchewan	2	0	2	4	3	1
Alberta	9	4	5	13	5	8
British Columbia	12	3	9	18	8	12
Yukon	0	0	0	0	0	0
North West Territories	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Canada	<u>86</u>	<u>38</u>	<u>47</u>	<u>92</u>	<u>46</u>	<u>48</u>

TABLE 6.4
TRAIN SERVICE ACCIDENTS BY REPORTING RAILWAY*
1983 - 1987

	1983	1984	1985	1986	1987
<u>CN</u>					
Employees struck by Rolling Stock	17	22	10	14	10
Passengers struck by Rolling Stock	0	0	1	0	0
Trespassers struck by Rolling Stock	<u>71</u>	<u>48</u>	<u>56</u>	<u>44</u>	<u>54</u>
Total CN	<u>88</u>	<u>70</u>	<u>67</u>	<u>58</u>	<u>64</u>
<u>CP</u>					
Employees struck by Rolling Stock	18	16	15	7	13
Passengers struck by Rolling Stock	0	0	1	0	0
Trespassers struck by Rolling Stock	<u>37</u>	<u>50</u>	<u>46</u>	<u>40</u>	<u>37</u>
Total CP	<u>55</u>	<u>66</u>	<u>62</u>	<u>47</u>	<u>50</u>
<u>Other Railways</u>					
Employees struck by Rolling Stock	0	0	0	0	0
Passengers struck by Rolling Stock	0	0	0	0	0
Trespassers struck by Rolling Stock	<u>2</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>1</u>
Total Other Railways	<u>2</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>1</u>
<u>All Railways</u>					
Employees struck by Rolling Stock	35	38	25	21	23
Passengers struck by Rolling Stock	0	0	2	0	0
Trespassers struck by Rolling Stock	<u>110</u>	<u>101</u>	<u>104</u>	<u>86</u>	<u>92</u>
Total accidents	<u>145</u>	<u>139</u>	<u>131</u>	<u>107</u>	<u>115</u>

* Excludes employees getting off/on rolling stock (data by railway not available for all years).

SECTION 7 Incidents

SECTION 7

INCIDENTS

Incidents

Incidents include fires, cases of dangerous commodity leakages (not always related to train movements) and other occurrences of a miscellaneous nature. Examples of the latter category include:

- personal injuries to employees or passengers such as striking against or being hit by an obstacle; burns; exposure; sprains, inhalation of dangerous fumes; etc.
- disruptions of service, washouts, obstructions to track, not resulting in a train accident.
- damage to bridges, culverts, or other structures not due to train accidents but including fire damage.

There were 301 fires in 1987, which is a substantial increase (31%) over the 1986 figure. The majority of fires are on right of way and these in turn are dependent on climatic conditions, and to a lesser degree on vandalism.

Dangerous Goods (D.G.) leakage incidents in this section are specifically those that arise in the transportation of dangerous goods other than due to train accidents. The latter are already included in the figures presented in earlier sections of this report. D.G. leakages totalled 439 in 1987. The considerable increase in recent years appears to relate mainly to more stringent inspection by railway companies.

All other incidents amounted to 2,469 in 1987, which is a 10.2% reduction from the 1986 total. The majority of these incidents were miscellaneous injuries sustained by employees and passengers not related to train accidents.

Casualties

Injuries as a result of fires in 1987 are up considerably over the 1986 total. The majority of these injuries are due to an incident on January 27, at Saskatoon, Sask. which involved a burning car containing Sodium Hydrosulphite; the incident resulted in non-major injuries (inhalation of dangerous fumes) to 12 firemen and 2 policemen. D.G. incidents accounted for 6 injuries in 1987. The vast majority of the 2,480 miscellaneous incident injuries during the year were due to the "all other incidents" as defined earlier. Over four-fifths of these "all other incidents" were personal injuries to employees.

Train passenger injuries accounted for a further 14%: the majority of these are instances such as passengers slipping or losing their balance while the train is in motion, spilling beverages, handling baggage, children playing in cars, using on-board facilities, etc. They also include cases of passengers tripping on station platforms, or injuring themselves when entraining/detraining stationary trains. There is no minimum severity for reporting miscellaneous incident injuries; they can range from a loss of a limb to cuts/bruises from a minor slip or fall.

TABLE 7.1
INCIDENTS AND CASUALTIES
1986 and 1987

	Incidents			Fatalities		Injuries	
	1986	1987	% Change	1986	1987	1986	1987
<u>Fires</u>							
Fires on Right of Way	208	280		0	0	0	0
Fires on Rolling Stock	15	13		0	0	1	19
Fires on Structures	<u>7</u>	<u>8</u>		<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Fires	<u>230</u>	<u>301</u>	30.9	<u>0</u>	<u>0</u>	<u>1</u>	<u>19</u>
<u>Dangerous Goods Incidents*</u>							
	<u>398</u>	<u>439</u>	10.3	<u>0</u>	<u>0</u>	<u>20</u>	<u>6</u>
<u>Other Miscellaneous Incidents</u>							
Involving Employees only	2,207	2,030		0	0	2,207	2,030
Involving Passengers only	416	349		0	3	416	346
Other Incidents	<u>126</u>	<u>90</u>		<u>3</u>	<u>1</u>	<u>22</u>	<u>29</u>
Total Other Incidents	<u>2,749</u>	<u>2,469</u>	-10.2	<u>3</u>	<u>4</u>	<u>2,645</u>	<u>2,405</u>
Total Incidents**	<u>3,377</u>	<u>3,209</u>	-5.0	<u>3</u>	<u>4</u>	<u>2,666</u>	<u>2,430</u>

* These totals relate to incidents involving the transportation of dangerous commodities other than in train accidents, many of these leakages being of a minor nature.

** 1987 data includes 17 non-employee injuries and 1 non-employee fatality
1986 data includes 7 non-employee injuries

TABLE 7.2
INCIDENTS AND CASUALTIES
1980 - 1987

	1980	1981	1982	1983	1984	1985	1986	1987
<u>Incidents</u>								
Fires	229	221	273	254	202	226	230	301
Dangerous Goods	107	157	105	288	418	336	398	439
All Other	N/A	<u>2,886</u>	<u>2,811</u>	<u>2,383</u>	<u>2,564</u>	<u>2,707</u>	<u>2,749</u>	<u>2,469</u>
Total Incidents*		<u><u>3,264</u></u>	<u><u>3,189</u></u>	<u><u>2,925</u></u>	<u><u>3,184</u></u>	<u><u>3,269</u></u>	<u><u>3,377</u></u>	<u><u>3,209</u></u>
<u>Casualties</u>								
<u>Fatalities</u>								
Fires	0	0	0	0	0	0	0	0
Dangerous Goods	0	0	0	0	0	0	0	0
All Other	N/A	<u>5</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>7</u>	<u>3</u>	<u>4</u>
Total Fatalities**		<u><u>5</u></u>	<u><u>8</u></u>	<u><u>6</u></u>	<u><u>2</u></u>	<u><u>7</u></u>	<u><u>3</u></u>	<u><u>4</u></u>
<u>Injuries</u>								
Fires	0	3	6	5	3	0	1	19
Dangerous Goods	23	1	1	7	5	7	20	6
All Other	N/A	<u>2,861</u>	<u>2,743</u>	<u>2,282</u>	<u>2,494</u>	<u>2,610</u>	<u>2,645</u>	<u>2,405</u>
Total Injuries**		<u><u>2,865</u></u>	<u><u>2,750</u></u>	<u><u>2,294</u></u>	<u><u>2,502</u></u>	<u><u>2,617</u></u>	<u><u>2,666</u></u>	<u><u>2,430</u></u>

* See footnotes to table 1.2

** 1987 data includes 17 non-employee injuries and 1 non-employee fatality
 1986 data includes 7 non-employee injuries
 1985 data includes 1 non-employee injury and 3 non-employee fatalities
 1984 data includes 2 non-employee injuries
 All other casualties are employees

SECTION 8 Serious Collisions and Derailments

SECTION 8

SERIOUS COLLISIONS AND DERAILMENTS

To the casual observer of accident statistics, the 1987 total of 81 collisions and 256 derailments (See Sections 2 and 3) can be misinterpreted and present cause for undue alarm. For instance, from an arithmetical standpoint, one could say that every day Canadian railways are involved in either a collision or a derailment. While not totally untrue, such a statement might bring to mind head-on collisions involving passenger trains and multi-car derailments involving the leakage of dangerous goods. Fortunately, such cases are rare. It has been pointed out in the above Sections that many of the collisions and derailments reported to the NTA are of a minor nature: a large proportion occur in yards, spurs and sidings during the course of switching/humping operations at slow speed and are reportable even if the involved car is a dangerous goods (D.G.) "empty". In addition, over half of all train derailments involve the derailment of only one or two cars.

In order to put the collision/derailment annual totals into a proper perspective, the concept of "serious" collisions and derailments is employed. The RPID uses a set of criteria to indicate the seriousness of such accidents, and an occurrence is defined as "serious" depending upon the degree of human casualty, severity of D.G. involvement, and the monetary extent of the property damage (See Appendix for details). For example, of the total collisions and derailments in 1987, 8 collisions and 42 derailments are considered to be "serious" by the RPID. The total of 50 serious accidents in 1987 is also a substantial reduction from the 63 accidents classified as serious in 1986.

The number of serious and total collisions/derailments are presented in Table 8.1. It can be seen that during the 1983-1987 period, only 13% of all collisions fell in the serious category while serious derailments accounted for approximately one-fifth of all derailments (Also see Fig. 8.1). The table also indicates an annual average of 61 serious accidents over the past five years. Approximately four-fifths of these serious cases were those involving property damage in excess of \$100,000; however, half of these property damage accidents were under \$250,000. The remaining cases were those with serious casualty, or D.G. involvement (see Fig. 8.2). A more detailed breakdown of serious accidents by severity category is presented in Table 8.2

Figure 8.1 COMPARISON OF SERIOUS TRAIN COLLISIONS AND TRAIN DERAILMENTS WITH TOTAL TRAIN COLLISIONS AND TRAIN DERAILMENTS 1985-1987

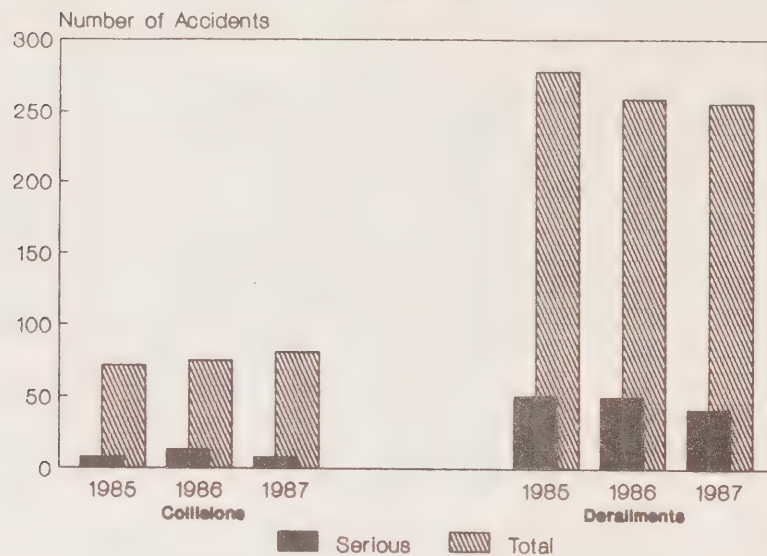
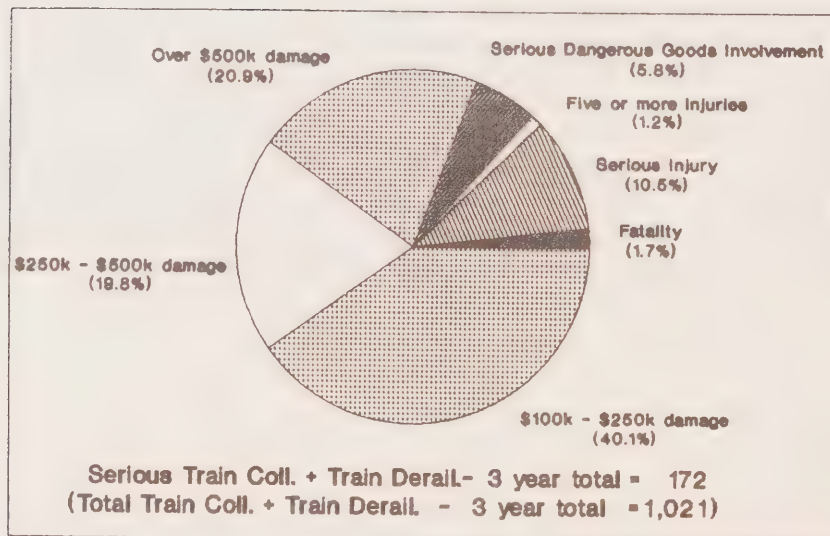


Figure 8.2

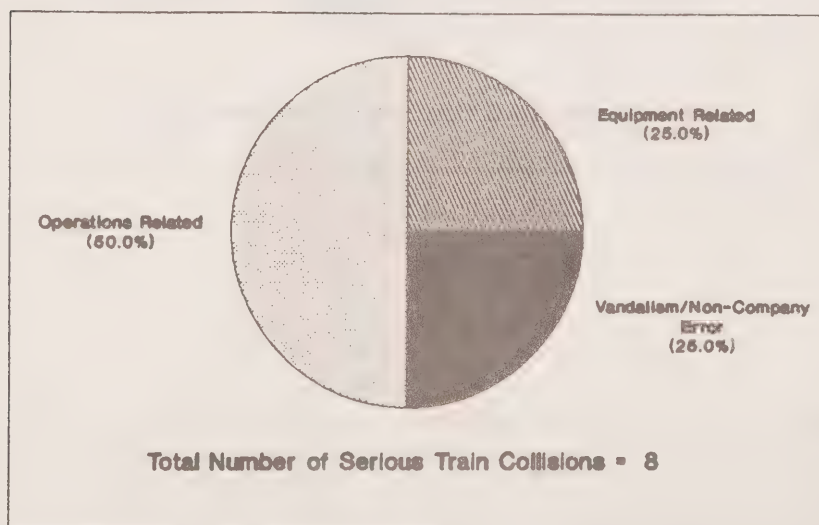
SERIOUS TRAIN COLLISIONS AND TRAIN DERAILMENTS 1985-1987



The fact that a total of 337 train derailments and collisions were reported to the RPID in 1987, clearly indicates that railway transportation presents a certain level of risk. Given that a degree of public concern and anxiety about the risk exists, this section has attempted to focus that concern specifically on those accidents that present a greater degree of risk to the public. The regulator and carrier should therefore both place a strong emphasis on reducing the number of serious accidents and thereby reduce the magnitude of the risk associated with railway operations. Table 8.3 therefore examines the causes of serious collisions and derailments; this examination is taken one step further in Tables 8.4 and 8.5 which present the breakdown of cause by railway.

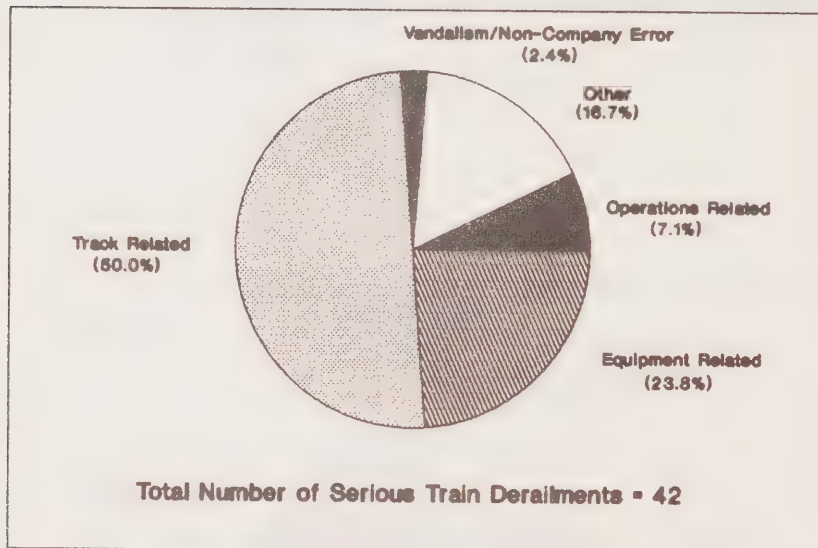
Serious collisions do not appear to occur exclusively on the main track (of the 29 serious collisions that have occurred in the last three years, 13 were on the main track). The causes of all collisions classified as serious in 1985 and 1986 were mostly operation related (in Section 2, operational factors were pointed out to be the major cause of train collisions). In 1987, however, 4 of the 8 serious collisions were attributable to non-operational factors; two were equipment related and two were the result of non-equipment error (Fig. 8.3(a)). CN accounted for 6 of the serious accidents in 1987, including the two attributed to equipment defects.

Figure 8.3(a) **SERIOUS TRAIN COLLISIONS
BY CAUSE
1987**



Most serious derailments occur on the main track. In Section 3, it was shown that operational factors do not play such a large role in main track derailments. This is also true for serious derailments. However, the breakdown of serious derailments for the other cause categories is different from Section 3 for the year 1987 in that track conditions feature particularly high on serious cases. Fig. 8.3(b) shows that half the serious derailments were track related. Furthermore, of the 42 serious derailments in 1987, 34 occurred on CN track; and of these cases, 19 were due to track defects.

**Figure 8.3(b) SERIOUS TRAIN DERAILMENTS
BY CAUSE
1987**



Damage costs in track related derailments can be quite high and it could therefore be argued that this inflates the percentage of serious accidents due to track related causes. Nevertheless, the "breakdown" by cause tables point out that non-operational factors are predominantly at play in serious accidents. Although serious occurrences declined significantly from 63 in 1986 to 50 in 1987, the data indicates a large increase in CN's 1987 serious derailments due to track related factors. The increase from 10 such cases in 1986 to 19 in 1987 presents some cause for concern. This is an area that will be investigated further, in order that serious accident frequency may be further reduced.

Although this Section has not examined crossing accidents, this type of railway accident can also be categorized as being "serious". Crossing accidents are most critical in terms of human casualty. To place the annual average of 550 crossing accidents over the past five years in a "serious" perspective, it is pointed out that 9% of these resulted in a fatality. An additional 34% resulted in injury, although this percentage includes non-serious injuries. In terms of financial damage to railway property and equipment, however, crossing accidents as a rule, are not as serious as collisions and derailments. Usually it is the motor vehicle that is heavily damaged or destroyed. Crossing accidents may result in substantial railway damage if an ensuing derailment occurs, but such cases amounted to less than 3% of the total crossing accidents during the years 1983-87. The involvement of D.G. in a crossing accident is also not as common an occurrence as it is for derailments/collisions. Over the past five years, only 1.7% of all crossing accidents have involved D.G.

TABLE 8.1
SERIOUS AND TOTAL TRAIN COLLISIONS AND DERAILMENTS
1983 - 1987

	1983	1984	1985	1986	1987
<u>Collisions</u>					
Serious	13	11	8	13	8
Total	92	102	72	75	81
<u>Derailments</u>					
Serious	47	60	51	50	42
Total	254	273	278	259	256
<u>Collisions and Derailments</u>					
Serious	60	71	59	63	50
Total	346	375	350	334	337

TABLE 8.2
SERIOUS COLLISIONS AND DERAILMENTS
1983 - 1987

	1983	1984	1985	1986	1987
<u>Collisions</u>					
Fatality	2	0	0	2	0
Major injury	2	5	7	5	0
Five or more minor injuries	3	1	0	1	1
Major dangerous goods release	0	2	0	0	1
Property damage exceeding \$500,000	0	0	0	1	0
Property damage in range of \$250,000 - \$500,000	2	1	0	2	2
Property damage in range of \$100,000 - \$250,000	<u>4</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>4</u>
Total Serious Collisions	<u>13</u>	<u>11</u>	<u>8</u>	<u>13</u>	<u>8</u>
<u>Deraillments</u>					
Fatality	0	1	1	0	0
Major injury	3	0	2	3	1
Five or more minor injuries	2	0	0	0	0
Major dangerous goods release	0	3	5	3	1
Property damage exceeding \$500,000	11	13	6	14	15
Property damage in range of \$250,000 - \$500,000	10	19	12	6	12
Property damage in range of \$100,000 - \$250,000	<u>21</u>	<u>24</u>	<u>25</u>	<u>24</u>	<u>13</u>
Total Serious Deraillments	<u>47</u>	<u>60</u>	<u>51</u>	<u>50</u>	<u>42</u>
<u>Collisions and Deraillments</u>					
Fatality	2	1	1	2	0
Major injury	5	5	9	8	1
Five or more minor injuries	5	1	0	1	1
Major dangerous goods release	0	5	5	3	2
Property damage exceeding \$500,000	11	13	6	15	15
Property damage in range of \$250,000 - \$500,000	12	20	12	8	14
Property damage in range of \$100,000 - \$250,000	<u>25</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>17</u>
Total Serious Collisions and Serious Deraillments	<u>60</u>	<u>71</u>	<u>59</u>	<u>63</u>	<u>50</u>

TABLE 8.3
SERIOUS COLLISIONS AND DERAILMENTS BY CAUSE
1985 - 1987

	1985		1986		1987	
	Number	%	Number	%	Number	%
<u>Collisions</u>						
Track Related	0	0.0	1	7.7	0	0.0
Equipment Related	0	0.0	0	0.0	2	25.0
Other	0	0.0	0	0.0	0	0.0
Operations Related	7	87.5	11	84.6	4	50.0
Vandalism/Non- Company Error	<u>1</u>	<u>12.5</u>	<u>1</u>	<u>7.7</u>	<u>2</u>	<u>25.0</u>
Total Serious Collisions	<u>8</u>	<u>100.0</u>	<u>13</u>	<u>100.0</u>	<u>8</u>	<u>100.0</u>
<u>Deraillments</u>						
Track Related	35	68.6	19	38.0	21	50.0
Equipment Related	11	21.6	19	38.0	10	23.8
Operations Related	2	3.9	1	2.0	3	7.1
Other	3	5.9	9	18.0	7	16.7
Vandalism/Non- Company Error	<u>0</u>	<u>0.0</u>	<u>2</u>	<u>4.0</u>	<u>1</u>	<u>2.4</u>
Total Serious Deraillments	<u>51</u>	<u>100.0</u>	<u>50</u>	<u>100.0</u>	<u>42</u>	<u>100.0</u>

TABLE 8.4
SERIOUS COLLISIONS BY CAUSE AND REPORTING RAILWAY
1985 - 1987

	Main Track			Other Movements			Total		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
<u>CN</u>									
Operations Related	1	4	1	2	4	1	3	8	2
Equipment Related	0	0	1	0	0	1	0	0	2
Track Related	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0
Vandalism/Non- Company Error	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>2</u>
Total CN	<u>2</u>	<u>4</u>	<u>2</u>	<u>2</u>	<u>5</u>	<u>4</u>	<u>4</u>	<u>9</u>	<u>6</u>
<u>CP</u>									
Operations Related	1	2	0	2	1	1	3	3	1
Equipment Related	0	0	0	0	0	0	0	0	0
Track Related	0	0	0	0	1	0	0	1	0
Other	0	0	0	0	0	0	0	0	0
Vandalism/Non- Company Error	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total CP	<u>1</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>3</u>	<u>4</u>	<u>1</u>
<u>Other Railways</u>									
Operations Related	1	0	1	0	0	0	1	0	1
Equipment Related	0	0	0	0	0	0	0	0	0
Track Related	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0
Vandalism/Non- Company Error	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other Railways	<u>1</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>1</u>
<u>All Railways</u>									
Operations Related	3	6	2	4	5	2	7	11	4
Equipment Related	0	0	1	0	0	1	0	0	2
Track Related	0	0	0	0	1	0	0	1	0
Other	0	0	0	0	0	0	0	0	0
Vandalism/Non- Company Error	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>2</u>
Total Serious Collisions	<u>4</u>	<u>6</u>	<u>3</u>	<u>4</u>	<u>7</u>	<u>5</u>	<u>8</u>	<u>13</u>	<u>8</u>

TABLE 8.5
SERIOUS DERAILMENTS BY CAUSE AND REPORTING RAILWAY
1986 and 1987

	Main Track			Other Movements			Total		
	1985	1986	1987	1985	1986	1987	1985	1986	1987
<u>CN</u>									
Track Related	22	9	18	3	1	1	25	10	19
Equipment Related	8	12	7	0	1	0	8	13	7
Operations Related	0	1	3	0	0	0	0	1	3
Other	2	4	4	0	0	0	2	4	4
Vandalism/Non- Company Error	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>2</u>	<u>1</u>
Total CN	<u>32</u>	<u>28</u>	<u>32</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>35</u>	<u>30</u>	<u>34</u>
<u>CP</u>									
Track Related	10	7	2	0	0	0	10	7	2
Equipment Related	3	5	3	0	0	0	3	5	3
Operations Related	1	0	0	0	0	0	1	0	0
Other	1	3	2	0	0	0	1	3	2
Vandalism/Non- Company Error	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total CP	<u>15</u>	<u>15</u>	<u>7</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>15</u>	<u>15</u>	<u>7</u>
<u>Other Railways</u>									
Track Related	0	2	0	0	0	0	0	2	0
Equipment Related	0	1	0	0	0	0	0	1	0
Operations Related	0	0	0	1	0	0	1	0	0
Other	0	2	1	0	0	0	0	2	1
Vandalism/Non- Company Error	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total Other Railways	<u>0</u>	<u>5</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>5</u>	<u>1</u>
<u>All Railways</u>									
Track Related	32	18	20	3	1	1	35	19	21
Equipment Related	11	18	10	0	1	0	11	19	10
Operations Related	1	1	3	1	0	0	2	1	3
Other	3	9	7	0	0	0	3	9	7
Vandalism/Non- Company Error	<u>0</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>2</u>	<u>1</u>
Total Serious Derailments	<u>47</u>	<u>48</u>	<u>40</u>	<u>4</u>	<u>2</u>	<u>2</u>	<u>51</u>	<u>50</u>	<u>42</u>

APPENDIX

APPENDIX

For statistical purposes, the RPID uses the following definitions:

Railway Occurrence

A generic expression that includes Train Accidents, Train Service Accidents and Incidents which are reported to the NTA pursuant to the requirements of S. 225 of the Railway Act, General Order 0-1 and related orders and regulations of the NTA.

Train Accident

An occurrence associated with the operation of a train, engine, car, track motor car (TMC) or other maintenance of way equipment (MWE) involving property damage in excess of \$7,000* for Main Track operations, and casualties or dangerous goods (D.G.) in respect of both Main Track and "Other" track operations (where "Other" includes yards, spurs, sidings and industry trackage), in which:-

- a) unit (s) of rolling stock derail (derailment)
- b) unit (s) of railway rolling stock collide with other unit (s) of railway rolling stock (collisions)
- c) unit (s) of railway rolling stock collide with vehicular traffic at level crossings at grade (crossing accident).

(All public/highway crossing accidents are reportable whereas accidents at farm and private crossings are reportable only if they involve a casualty/D.G./property damage in excess of \$7,000* for Main Track operations.)

Train Service Accident

An occurrence associated with the operation of a train, engine, car, TMC or other MWE in which a railway employee, a trespasser, a railway passenger or any other person is injured or killed as a result of being struck by railway rolling stock, or while in the process of entraining and detraining said rolling stock.

Incident

An occurrence, other than an accident, associated with the operation of a train:-

- a) which affects or could affect the safety of operation
- b) whereby railway employees, railway passengers or other persons sustain personal injuries or are killed as a result of the performance of their duties (other than by a Train Accident or Train Service Accident)

Other points of note:

Severity of injury

There is no minimum severity for reporting an injury - injuries can range from a loss of limb to cuts/bruises from a minor slip or fall.

Responsibility for Reporting an Occurrence

Railway occurrences are reportable only if they take place on track owned/serviced by railroads under federal jurisdiction, and responsibility for reporting normally lies with the railway that owns/services the trackage. It is important to note that the Summary presents accidents/incidents (and their associated casualties) as they are reported to the NTA and when statistics are presented by railway in this report (Sections 2, 3, 4, 5 and 8), the totals refer to the reporting railway. For accurate inter-railway comparisons therefore, accidents caused by external factor (vandalism, non-company error, etc.) should be excluded from the respective totals.

Severity Criteria for Serious Accidents

Serious accidents (train derailments and collisions) are defined by the RPID as those involving:

- a) a fatality;
- b) a major injury, e.g. loss of a limb or an eye, major fracture, etc.;
- c) five or more minor injuries;
- d) a major release of a dangerous good, e.g. resulting in or having potential for an explosion, fire or evacuation;
- e) railway property damage in the range of \$100,000 to \$250,000;
- f) railway property damage in the range of \$250,000 to \$500,000;
- g) railway property damage in excess of \$500,000.

Some accidents qualify under more than one of these headings and, in such cases, the accident is classified in accordance with the order of criteria given in this list. A property damage threshold of \$100,000 is very modest, given as an example, that the current price of a grain hopper car is \$80,000. However, this property damage figure relates only to damage incurred by the railway itself and does not include third party claims on the railways; while this omission has obvious disadvantages, time delays in determining third party claims would prevent up-to-date reporting.

- * Prior to November 1, 1987, the reporting threshold was \$750. This minimal damage amount has over the years been eroded by inflation and in order to reduce the reporting burden on the railways and bring the figure more in line with that used in the United States, the threshold was raised to \$7,000 on November 1, 1987. (On January 1, 1988 the property damage monetary threshold was increased to \$7,350.)

TABLE A
RAILWAY ACCIDENTS SUBJECT TO PUBLIC HEARING/SECTION 226 INQUIRY
1983 - 1987

Year	Date	Inquiry Type	Location	Type of Accident
1983	Mar. 23	Section 226 Inquiry	Wessex, Ont.	Main Track Collision
	May 16	Section 226 Inquiry	Geikie, Albt.	Main Track Collision
	June 10	Section 226 Inquiry	Toronto, Ont.	Other Collision
	Aug. 20	Section 226 Inquiry	Various Locations	Heavy Off-track Equipment
	Aug. 27	Public Hearing	St. Lazare, Man.	Public Crossing Accident
	Nov. 15	Section 226 Inquiry	Springhill, N.S.	Main Track Collision
	Dec. 15	Section 226 Inquiry	Winnipeg, Man.	Other Collision
1984	Jan. 7	Section 226 Inquiry	Medicine Hat, Albt.	Main Track Derailment
	Feb. 10	Section 226 Inquiry	Gracefield, P.Q.	Public Crossing Accident
	Feb. 28	Public Hearing	Vaughan, Ont.	Tank Car Failure
	Mar. 30	Section 226 Inquiry	Milton, Ont.	Public Crossing Accident
	June 21	Section 226 Inquiry	Nepean, Ont.	Main Track Collision
	July 23	Section 226 Inquiry	North Bay, Ont.	Car Centre Plate Failure
	July 28	Section 226 Inquiry	Vareness, P.Q.	Main Track Collision
1985	Feb. 11	Section 226 Inquiry	Sarnia, Ontario	Other Derailment
	Feb. 24	Section 226 Inquiry	Petawawa, Ontario	Main Track Derailment
	Apr. 27	Section 226 Inquiry	Lashburn, Sask.	Main Track Derailment
	July 24	Section 226 Inquiry	Penhold, Albt.	Public Crossing Accident
	Aug. 10	Section 226 Inquiry	Winnipeg, Man.	Main Track Collision
	Dec. 31	Section 226 Inquiry	Bolingbroke, Ont.	Main Track Derailment
1986	Jan. 2	Section 226 Inquiry	Elfros, Sask.	Main Track Derailment
	Jan. 4	Section 226 Inquiry	Campellton, N.B.	Leaking Tank Car
	Jan. 11	Section 226 Inquiry	Lac Edouard, P.Q.	Main Track Derailment
	Jan. 28	Section 226 Inquiry	Raith, Ont.	Main Track Derailment
1986	Feb. 8	Public Hearing	Hinton, Albt.	Main Track Collision
	Feb. 12	Section 226 Inquiry	Mactier, Ont.	Main Track Derailment
	Feb. 15	Section 226 Inquiry	Fort Langley, B.C.	Main Track Derailment
	Feb. 15	Public Hearing	Trudel, P.Q.	Main Track Collision
	Mar. 10	Section 226 Inquiry	Cambridge, Ont.	Main Track Derailment
	Apr. 2	Section 226 Inquiry	Long Sault, Ont.	Main Track Derailment
	Apr. 16	Section 226 Inquiry	Various Locations	Tank Car Deficiencies
	May 24	Section 226 Inquiry	St. Rosalie, P.Q.	Leaking Tank Car
	June 12	Section 226 Inquiry	Shawinigan, P.Q.	Main Track Collision
	Sept 17	Section 226 Inquiry	Espanola, Ont.	Main Track Collision
1987	Mar. 9	Section 226 Inquiry	Thomson, N.S.	Main Track Derailment
	Mar. 9	Section 226 Inquiry	Nepisiquit, N.B.	Main Track Derailment
	Apr. 2	Section 226 Inquiry	Andover, N.B.	Bridge Washout
	May 3	Section 226 Inquiry	Chatham, Ont.	Runaway Train
	May 27	Section 226 Inquiry	Makinak, Man.	Main Track Collision
	July 14	Section 226 Inquiry	Don Mills, Ont.	Main Track Derailment

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